Service
Service
Service

Product Service Group CE Audio

Service Information

Already published Service Informations :

CHANGES DURING PRODUCTION

FRONT BOARD

*From production week 0217 onwards the following has been changed to solve Thin/Thick Disc readability problem and to improve on the Tape transition timings.

Change 7400 3139 110 53251 TMP87CS71F - 'MZ9S53251'

*From production week 0225 onwards the following has been changed due to material end of life.

Change 7402 9322 140 83682 IC M24C01-BN6

ETF7 ND/DD/FR TAPE MODULE

*From production week 0218 onwards the ETF7 ND/DD/FR Tape Module is introduced to replace the ETF5-FE ND/DD/FR Tape Module for cost savings. For this reason new layout and circuit drawing are enclosed (Page 9-1 to 9-14).

ETF7 TAPE MODULE

(Non-Dolby Version)

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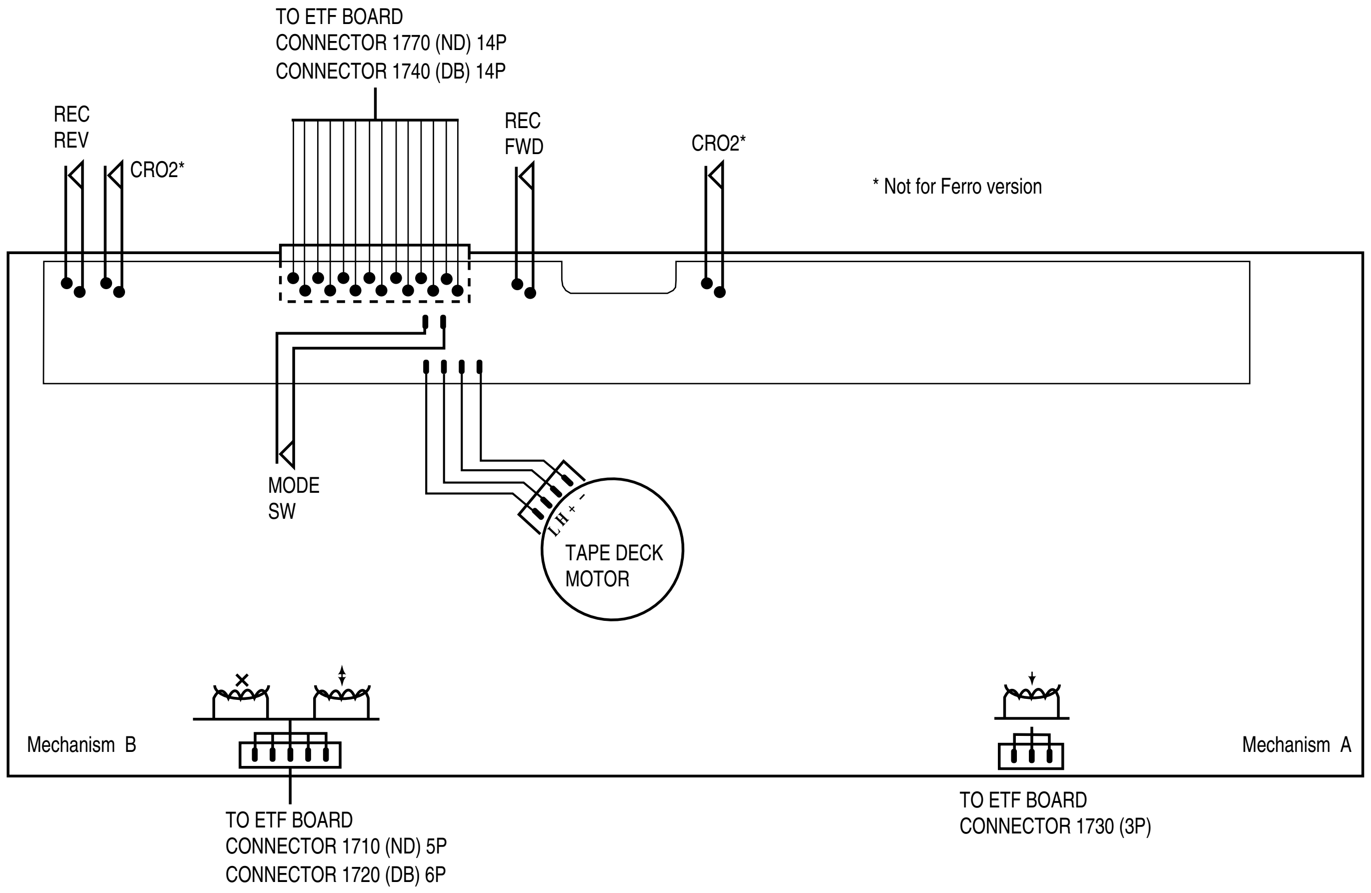
Tapedeck wiring (Double deck)



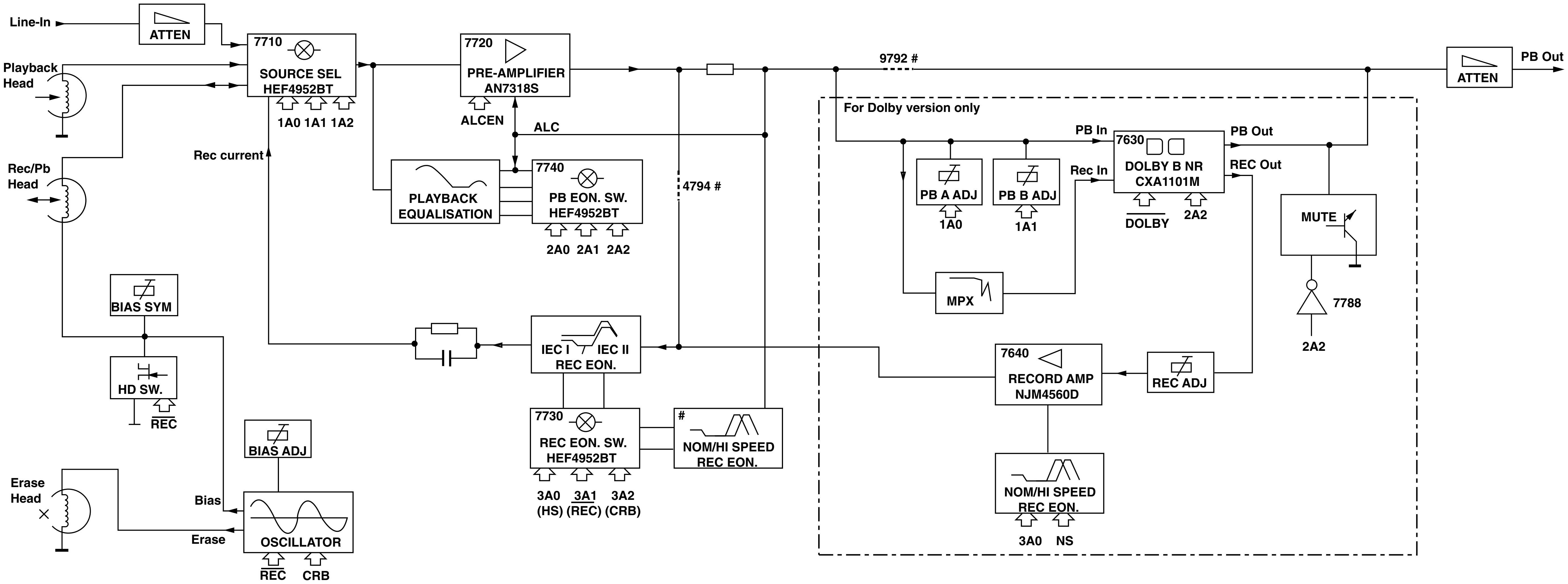
TO ETF BOARD
CONNECTOR 1770 (ND) 14P
CONNECTOR 1740 (DB) 14P
REC REV
CRO2*
REC FWD
CRO2*
* Not for Ferro version
MODE SW
TAPE DECK MOTOR
Mechanism B
Mechanism A
TO ETF BOARD
CONNECTOR 1710 (ND) 5P
CONNECTOR 1720 (DB) 6P
TO ETF BOARD
CONNECTOR 1730 (3P)

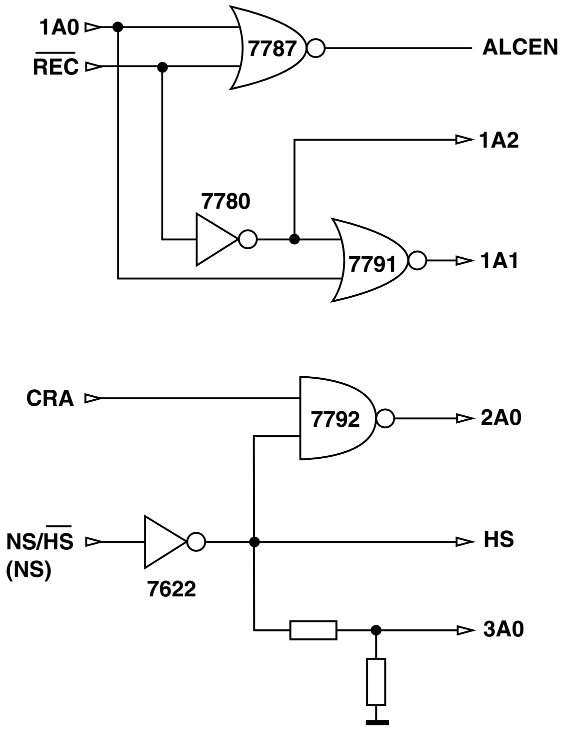
Variations table for Analog Circuit

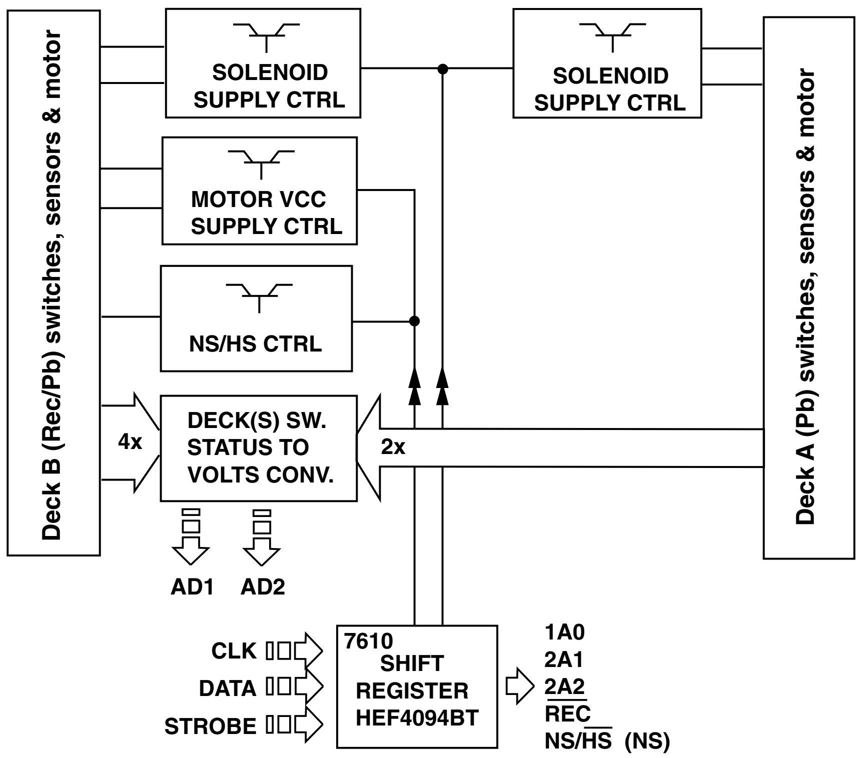
	Autoreverse ND/DD/FR	Non-autoreverse ND/DD/FF	
	Chrome/Ferro	Chrome/Ferro	Ferro
2624	-	-	100nF
2701 , 2702	150pF	270pF	270pF
2703 , 2704	100pF	220pF	220pF
2717 , 2718	10nF	15nF	15nF
2721 , 2722	6,8nF	6,8nF	-
2727 , 2728	470pF	1nF	1nF
3616	10k	1k	1k
3618	6k8	-	-
3620	10k trimmer	-	-
3622	-	10k trimmer	10k trimmer
3672	4k7	-	-
3676	47k	-	-
3687	220R	220R	-
3688	680R	-	-
3723 , 3724	15k	18k	18k
3725 , 3726	10R	10R	-
3727 , 3728	5k6	6k8	6k8
3729 , 3730	3k3	4k7	4k7
3743 , 3744	1k5	2k2	2k2
3745 , 3746	3k3	5k6	5k6
3754 , 3755	1M	47R	47R

	Autoreverse ND/DD/FR	Non-autoreverse ND/DD/FF	
	Chrome/Ferro	Chrome/Ferro	Ferro
3769	12k	8k2	8k2
3772	6k8	5k6	5k6
4785	-	-	0R jumper
3774	15k	8k2	8k2
6614	1N4148	-	-
7616	BC857B	-	-
7622	BC847B	-	-

BLOCK DIAGRAM


Line-In
ATTEN
Playback Head
Rec/Pb Head
7710
SOURCE SEL
HEF4952BT
1A0 1A1 1A2
7720
PRE-AMPLIFIER
AN7318S
ALCEN
ALC
9792 #
ATTEN
PB Out
Rec current
PLAYBACK EQUALISATION
7740
PB EON. SW.
HEF4952BT
2A0 2A1 2A2
4794 #
For Dolby version only
PB In
7630
DOLBY B NR
CXA1101M
PB Out
REC Out
Rec In
PB A ADJ
1A0
PB B ADJ
1A1
DOLBY
2A2
MUTE
7788
2A2
MPX
BIAS SYM
HD SW.
REC
IEC I
IEC II
REC EON.
7640
RECORD AMP
NJM4560D
REC ADJ
BIAS ADJ
7730
REC EON. SW.
HEF4952BT
3A0 3A1 3A2
(HS) (REC) (CRB)
#
NOM/HI SPEED
REC EON.
NOM/HI SPEED
REC EON.
3A0 NS
Erase Head
Bias
Erase
OSCILLATOR
REC CRB


1A0
REC
7787
ALCEN
1A2
7780
7791
1A1
CRA
7792
2A0
NS/HS
(NS)
7622
HS
3A0


Deck B (Rec/Pb) switches, sensors & motor
SOLENOID SUPPLY CTRL
MOTOR VCC SUPPLY CTRL
NS/HS CTRL
4x
DECK(S) SW. STATUS TO VOLTS CONV.
2x
AD1 AD2
SOLENOID SUPPLY CTRL
Deck A (Pb) switches, sensors & motor
CLK
DATA
STROBE
7610
SHIFT REGISTER
HEF4094BT
1A0
2A1
2A2
REC
NS/HS (NS)

NOTE: # For Non-dolby version only
Only 1 channel is presented.

▯▯⇨ MicroProcessor Control / Communication lines

⇨ Direct / Indirect Control lines from Shift Registers

Brief introduction

General

1. Playback Mode

   Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952BT). The signal is amplified by amplifier IC7720 (AN7323S) before feeding to the IC7740 (HEF4952BT) and out to the AF Board via connector 1701.

2. Recording Mode

   Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952BT) which is then amplified by the amplifier IC7720 (AN7323S). The amplified output signal will pass through IC7730 (HEF4952BT) for record equalization and back to IC7710 (HEF4952BT) before registered into the Rec/PB Head of Deck B.

3. Dubbing Mode

   In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952BT) which is then equalised for playback mode by the amplifier IC7720 (AN7323S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.

4. Mode Selector

   The Mode Selector IC7710 (HEF4952BT) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.

5. Amplifier PB/REC

   Amplifier IC7720 (AN7323S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.

6. Automatic Level Control (ALC)

   ALC circuit consists of resistors (3760, 3765, 3766, 3767), capacitors (2762 , 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.

7. Muting Circuit (For Non-Dolby version only)

   Switch S4 of the IC7740 (HEF4952BT) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.

8. IC7740 (HEF4952BT)

   The function of the IC7740 (HEF4952BT) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.

9. IC7730 (HEF4952BT)

   The function of the IC7730 (HEF4952BT) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).

10. Bias Level

    Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.

11. Bias Symm (For Dolby B NR version only)

    Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.

12. PB Switch

    Playback Switch which consists of the FETs 7785 (For Dolby B NR version only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

13. Motor Speed (For FR versions only)

    During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.

14. IC7610 (HEF4094BT)

    IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952BT) via 1A0, 2A1 and 2A2. It also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is controlled via NS/HS.

Dolby Circuit (For sets with Dolby B NR version only)

15. IC7630 (CXA1551M)

    IC7630 (CXA1551M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by $\overline{\text{DOLBY}}$, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/ LOW for NR OFF/ON.

16. 19kHz Filter

    The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.

17. Level Adjust

    The Variable resistor 3635, 3636,3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz , 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.

18. Amplifier IC7640 (NJM4560M)

    The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.

19. Muting Circuit

    The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non-Autoreverse
FR	Autoreverse Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

CONNECTORS ASSIGNMENTS:

CONNECTOR 1701 INTERCONNECTION TO AF BOARD

○	1	REC-L	Record input left
○	2	REC-R	Record input right
○	3	GND A	AF Ground
○	4	TAPE-L	Playback output left
○	5	+12V	D.C. supply (+12V) for AF electronics
○	6	TAPE-R	Playback output right
○	7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703 INTERCONNECTION TO AF BOARD

○	1	GND M	Motor Ground
○	2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706 INTERCONNECTION TO FRONT BOARD

○	1	AD2	Deck sensing switches output voltage / Deck A EOT
○	2	AD1	Deck sensing switches output voltage / Deck B EOT
○	3	+5V	DC supply +5V for ADC network
○	4	GND P	Control & Oscillator Ground
○	5	CLK	HEF4094BT shift register Clock line
○	6	DATA	HEF4094BT shift register Data line
○	7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710 DECK B HEADS CONNECTON ***(For Non-Dolby version only)***

○	1	B R/P HD L+	R/P Head left channel positive
○	2	GND A	R/P Head return ground
○	3	B R/P HD R+	R/P Head right channel positive
○	4	ERASE HEAD	Erase Head
○	5	GND A	Erase Head ground

CONNECTOR 1720 DECK B HEADS CONNECTON ***(For Dolby B NR version only)***

○	1	B R/P HD L+	R/P Head left channel positive
○	2	B R/P HD L-	R/P Head left channel negative
○	3	B R/P HD R+	R/P Head right channel positive
○	4	B R/P HD R-	R/P Head right channel negative
○	5	ERASE HEAD	Erase Head
○	6	GND A	Erase Head ground

CONNECTOR 1730 DECK A HEAD CONNECTIONS ***(For Double Deck versions only)***

○	1	A PB HD L+	Pb Head left channel positive
○	2	GND A	Pb Head return ground shield
○	3	A PB HD R+	Pb Head right channel positive

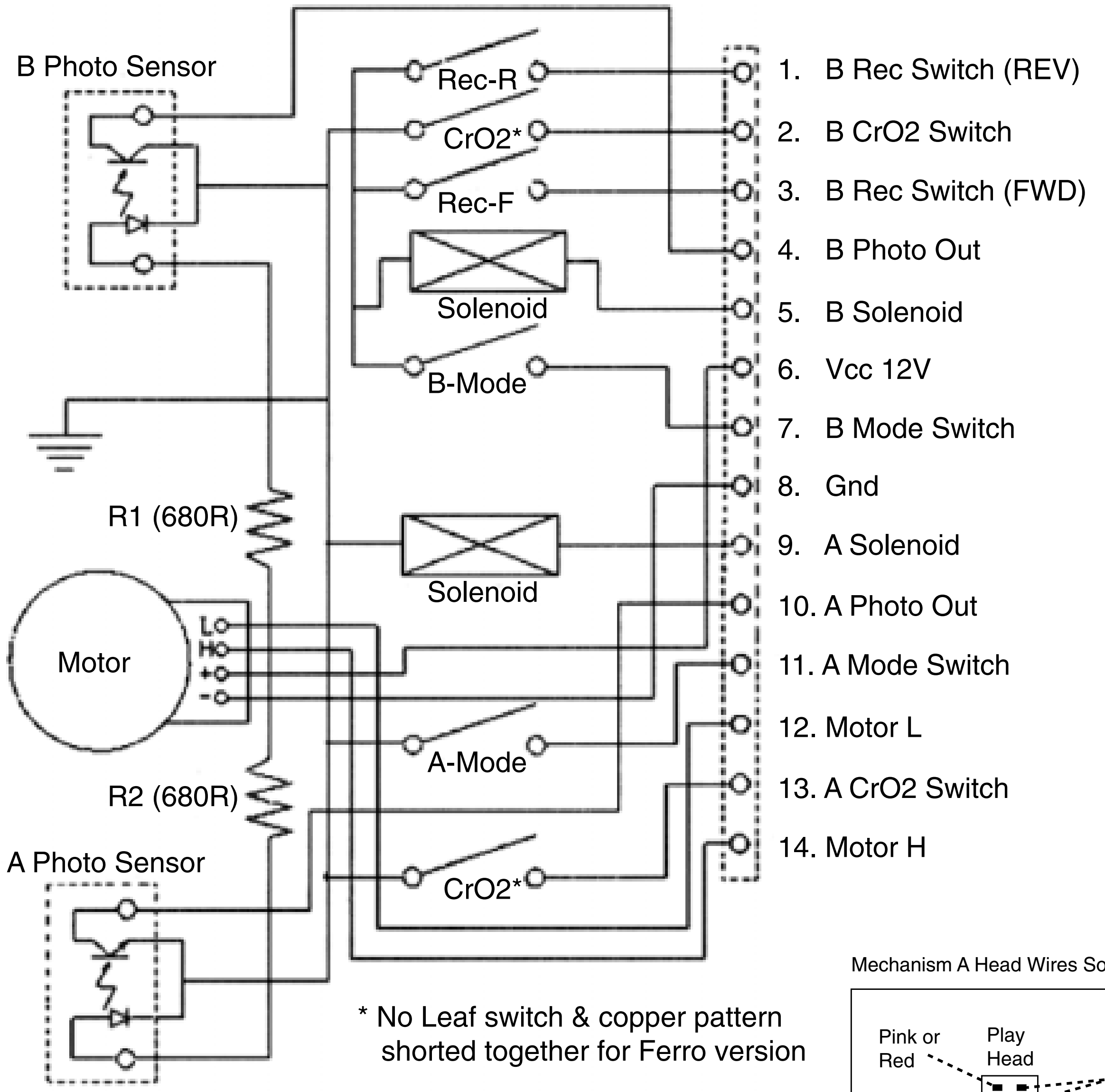
CONNECTOR 1740 DECK A & B CONTROL INTERFACE ***(For Dolby B NR version only)***

○	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○	2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
○	3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○	4	PHOTO B	Photo sensor output (tape movement indication)	
○	5	SOL B	Solenoid supply for deck B	
○	6	Vcc	Deck / Motor supply	
○	7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
○	8	GND M	Deck / Motor ground	
○	9	SOL A	Solenoid supply for deck A	
○	10	PHOTO A	Photo sensor output (tape movement indication)	
○	11	MODE A	Mode switch (head engagement)	[open=off: close=engaged]
○	12	L	L pin for motor	
○	13	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
○	14	H	H pin for motor	

CONNECTOR 1770 DECK A & B CONTROL INTERFACE ***(For Non-Dolby version only)***

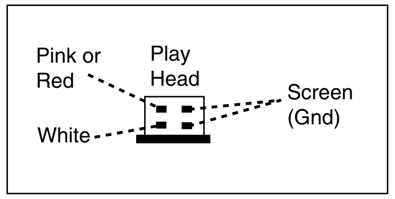
○	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○	2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
○	3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○	4	PHOTO B	Photo sensor output (tape movement indication)	
○	5	SOL B	Solenoid supply for deck B	
○	6	Vcc	Deck / Motor supply	
○	7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
○	8	GND M	Deck / Motor ground	
○	9	SOL A	Solenoid supply for deck A	
○	10	PHOTO A	Photo sensor output (tape movement indication)	
○	11	MODE A	Mode switch (head engagement)	[open=off: close=engaged]
○	12	L	L pin for motor	
○	13	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
○	14	H	H pin for motor	

TAPE MECHANISM ELECTRONICS

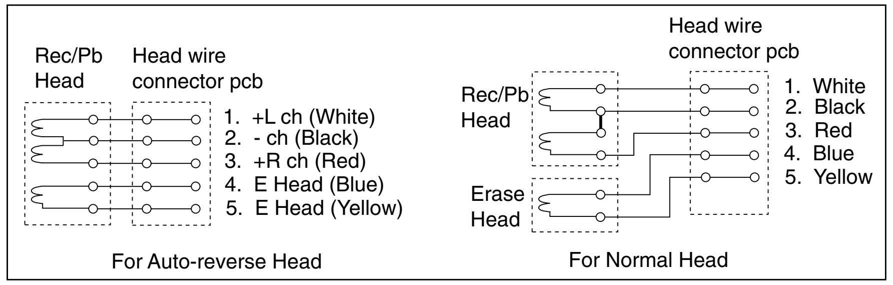

B Photo Sensor
Rec-R
CrO2*
Rec-F
Solenoid
B-Mode
R1 (680R)
Solenoid
Motor
L
H
+
-
A-Mode
R2 (680R)
A Photo Sensor
CrO2*
1. B Rec Switch (REV)
2. B CrO2 Switch
3. B Rec Switch (FWD)
4. B Photo Out
5. B Solenoid
6. Vcc 12V
7. B Mode Switch
8. Gnd
9. A Solenoid
10. A Photo Out
11. A Mode Switch
12. Motor L
13. A CrO2 Switch
14. Motor H

* No Leaf switch & copper pattern shorted together for Ferro version

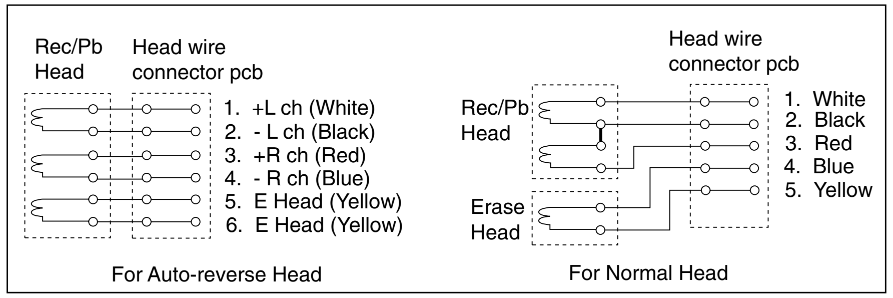
Mechanism A Head Wires Soldering


Pink or Red
Play Head
White
Screen (Gnd)

Mechanism B Head Wires Soldering (Non-Dolby version)


Rec/Pb Head
Head wire connector pcb
1. +L ch (White)
2. - ch (Black)
3. +R ch (Red)
4. E Head (Blue)
5. E Head (Yellow)
For Auto-reverse Head
Head wire connector pcb
Rec/Pb Head
Erase Head
1. White
2. Black
3. Red
4. Blue
5. Yellow
For Normal Head

Mechanism B Head Wires Soldering (Dolby B NR version)


Rec/Pb Head
Head wire connector pcb
1. +L ch (White)
2. - L ch (Black)
3. +R ch (Red)
4. - R ch (Blue)
5. E Head (Yellow)
6. E Head (Yellow)
For Auto-reverse Head
Head wire connector pcb
Rec/Pb Head
Erase Head
1. White
2. Black
3. Red
4. Blue
5. Yellow
For Normal Head

TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
NORMAL SPEED	SBC420 3150Hz	PLAY B	1 or 2 LEFT RIGHT	frequency counter	3620	3150Hz +/- 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 3150Hz	PLAY	1 or 2 LEFT RIGHT	W&F-meter	check	<0.4 % DIN
ADJUST AZIMUTH						
DECK A & B	SBC420 10kHz	PLAY FWD	1 or 2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	
CHECK PLAYBACK FREQUENCY RESPONSE						
DECK A & B	SBC420	PLAY	1 or 2 LEFT RIGHT	mV-meter	check	limits see fig.1
ADJUST BIAS CURRENT						
DECK B	SBC419A^	RECORD	5 or 6 LEFT RIGHT	mV-meter	3773	995mV
	SBC420				check	750mV +/- 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via 3 or 4	SBC419A^ or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	1 or 2 LEFT RIGHT	mV-meter	check	limits see fig. 2 *
Inject 1kHz 8.85mV via 3 or 4	SBC419A^ or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	1 or 2 LEFT RIGHT	THD-meter	check	<3% *

SBC419A^ :	4822 397 30069
SBC420 :	4822 397 30071

# For Auto-reverse version only

* If high frequencies are not within limits, decrease bias and re-measure. If distortion is too high, increase bias and re-meaure

^ Not applicable for Ferro version

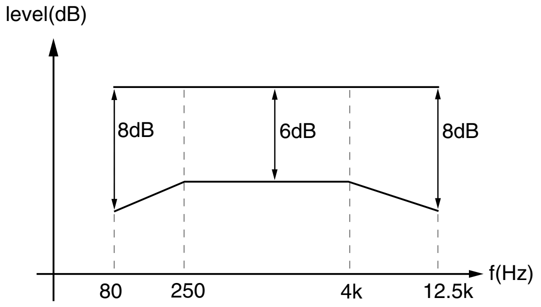


figure. 1

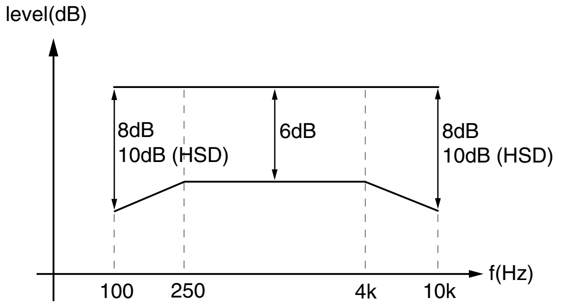
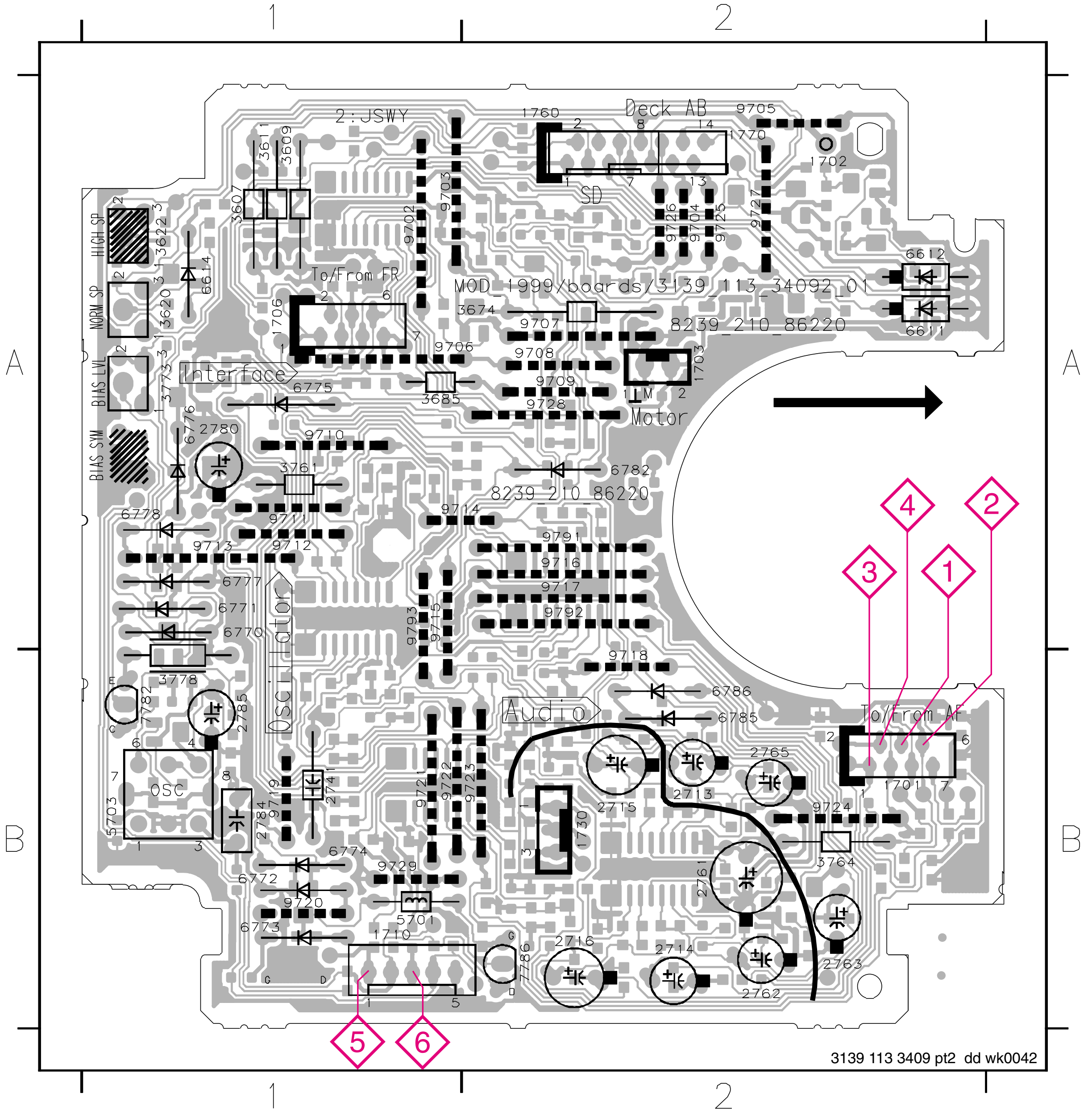


figure. 2

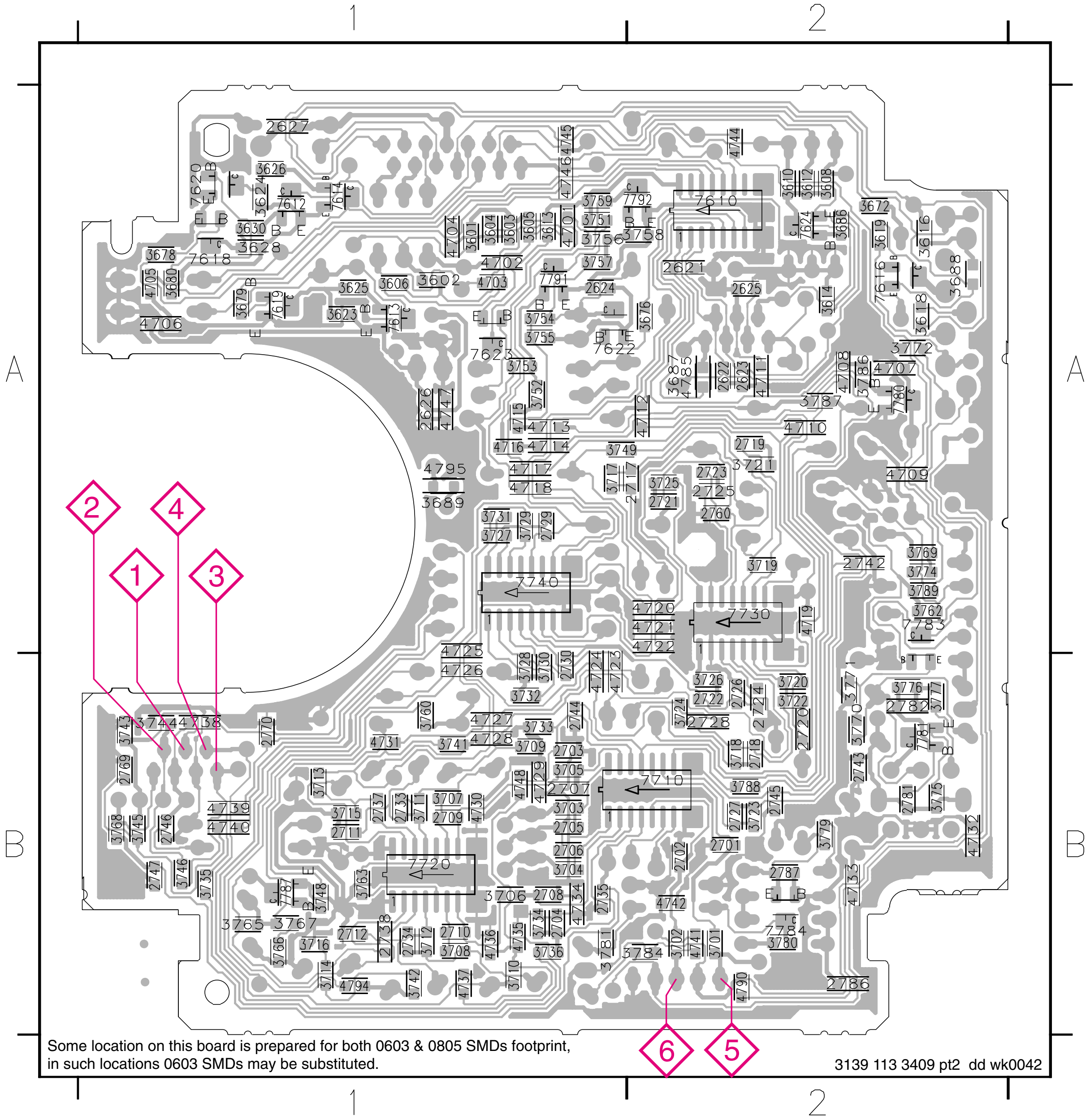
COMPONENT LAYOUT

1701	B2	2714	B2	2784	B1	3761	A1	6770	A1	6782	A2	9706	A1	9715	A1	9724	B2
1702	A2	2715	B2	2785	B1	3764	B2	6771	A1	6785	B2	9707	A2	9716	A2	9725	A2
1703	A2	2716	B2	3607	A1	3773	A1	6772	B1	6786	B2	9708	A2	9717	A2	9726	A2
1706	A1	2741	B1	3609	A1	3778	B1	6773	B1	7782	B1	9709	A2	9718	B2	9727	A2
1710	B1	2761	B2	3611	A1	5701	B1	6774	B1	7786	B2	9710	A1	9719	B1	9728	A2
1730	B2	2762	B2	3620	A1	5703	B1	6775	A1	9702	A1	9711	A1	9720	B1	9729	B1
1760	A2	2763	B2	3622	A1	6611	A2	6776	A1	9703	A1	9712	A1	9721	B1	9791	A2
1770	A2	2765	B2	3674	A2	6612	A2	6777	A1	9704	A2	9713	A1	9722	B1	9792	A2
2713	B2	2780	A1	3685	A1	6614	A1	6778	A1	9705	A2	9714	A1	9723	B2	9793	A1


1
2
A
B
2:JSWY
1760
Deck AB
9705
1770
1702
SD
HIGH SP
NORM SP
BIAS LVL
BIAS SW
To/From FR
MOD_1999/boards/3139 113 34092_01
8239 210 86220
Interface
Motor
Oscillator
Audio
OSC
To/From AF
1701
1730
1710
6612
6611
1
2
3
4
5
6
3139 113 3409 pt2 dd wk0042

CHIP LAYOUT

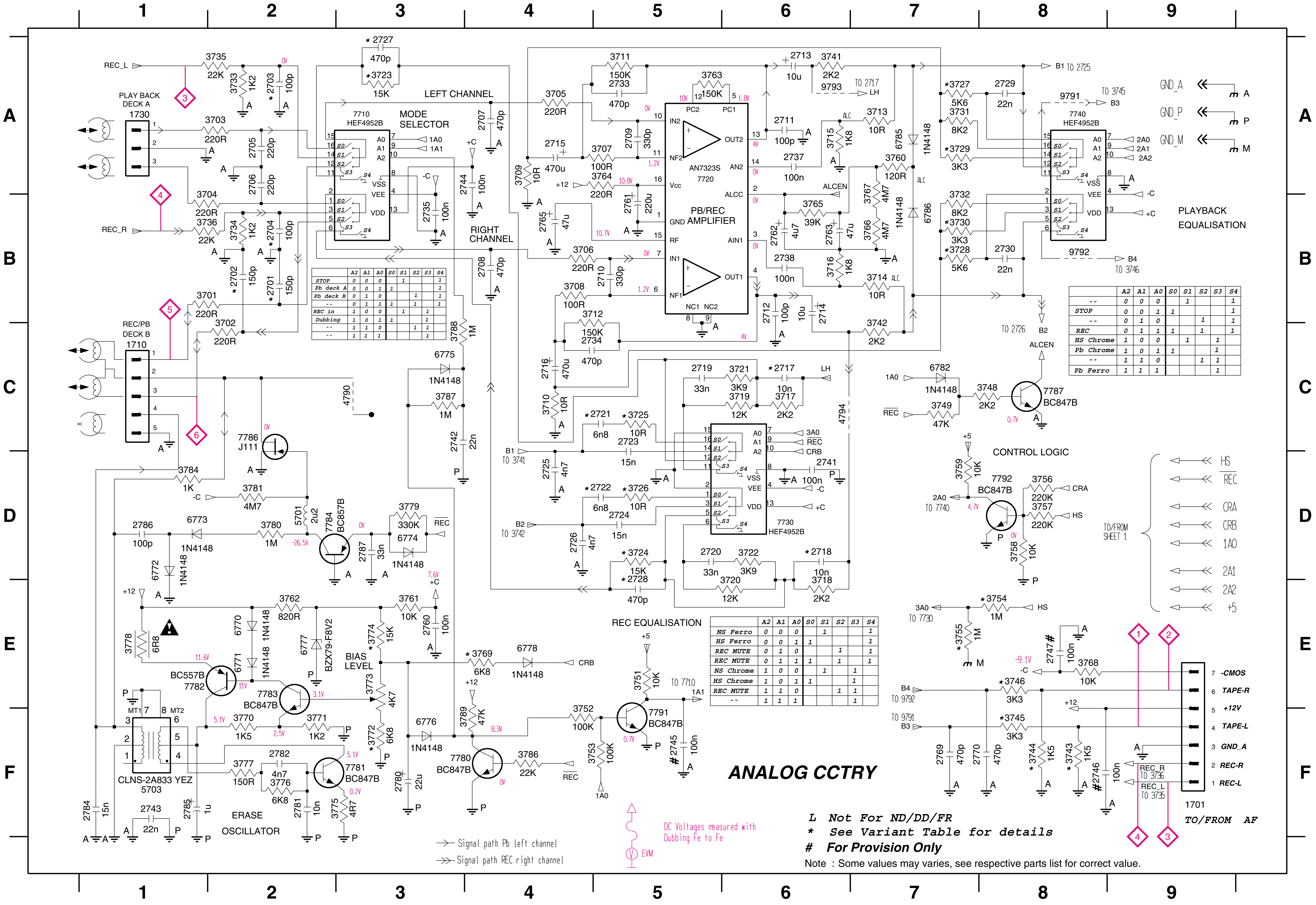
2621	A2	2724	B2	3602	A1	3688	A2	3725	A2	3757	A1	4701	A1	4727	B1	7612	A1
2622	A2	2725	A2	3603	A1	3689	A1	3726	B2	3758	A2	4702	A1	4728	B1	7613	A1
2623	A2	2726	B2	3604	A1	3701	B2	3727	A1	3759	A1	4703	A1	4729	B1	7614	A1
2624	A1	2727	B2	3605	A1	3702	B2	3728	B1	3760	B1	4704	A1	4730	B1	7616	A2
2625	A2	2728	B2	3606	A1	3703	B1	3729	A1	3762	A2	4705	A1	4731	B1	7618	A1
2626	A1	2729	A1	3608	A2	3704	B1	3730	B1	3763	B1	4706	A1	4732	B2	7619	A1
2627	A1	2730	B1	3610	A2	3705	B1	3731	A1	3765	B1	4707	A2	4733	B2	7620	A1
2701	B2	2733	B1	3612	A2	3706	B1	3732	B1	3766	B1	4708	A2	4734	B1	7622	A1
2702	B2	2734	B1	3613	A1	3707	B1	3733	B1	3767	B1	4709	A2	4735	B1	7623	A1
2703	B1	2735	B1	3614	A2	3708	B1	3734	B1	3768	B1	4710	A2	4736	B1	7624	A2
2704	B1	2737	B1	3616	A2	3709	B1	3735	B1	3769	A2	4711	A2	4737	B1	7710	B2
2705	B1	2738	B1	3618	A2	3710	B1	3736	B1	3770	B2	4712	A2	4738	B1	7720	B1
2706	B1	2742	A2	3619	A2	3711	B1	3741	B1	3771	B2	4713	A1	4739	B1	7730	A2
2707	B1	2743	B2	3623	A1	3712	B1	3742	B1	3772	A2	4714	A1	4740	B1	7740	A1
2708	B1	2744	B1	3624	A1	3713	B1	3743	B1	3774	A2	4715	A1	4741	B2	7780	A2
2709	B1	2745	B2	3625	A1	3714	B1	3744	B1	3775	B2	4716	A1	4742	B2	7781	B2
2710	B1	2746	B1	3626	A1	3715	B1	3745	B1	3776	B2	4717	A1	4744	A2	7783	A2
2711	B1	2747	B1	3628	A1	3716	B1	3746	B1	3777	B2	4718	A1	4745	A1	7784	B2
2712	B1	2760	A2	3630	A1	3717	A1	3748	B1	3779	B2	4719	A2	4746	A1	7787	B1
2717	A2	2769	B1	3672	A2	3718	B2	3749	A1	3780	B2	4720	A2	4747	A1	7791	A1
2718	B2	2770	B1	3676	A2	3719	A2	3751	A1	3781	B1	4721	A2	4748	B1	7792	A2
2719	A2	2781	B2	3678	A1	3720	B2	3752	A1	3784	B2	4722	A2	4785	A2		
2720	B2	2782	B2	3679	A1	3721	A2	3753	A1	3786	A2	4723	B1	4790	B2		
2721	A2	2786	B2	3680	A1	3722	B2	3754	A1	3787	A2	4724	B1	4794	B1		
2722	B2	2787	B2	3686	A2	3723	B2	3755	A1	3788	B2	4725	A1	4795	A1		
2723	A2	3601	A1	3687	A2	3724	B2	3756	A1	3789	A2	4726	B1	7610	A2		


1
2
A
B
2627
7610
7730
7740
7710
7720
1
2
3
4
5
6
3139 113 3409 pt2 dd wk0042

Some location on this board is prepared for both 0603 & 0805 SMDs footprint,
in such locations 0603 SMDs may be substituted.

ANALOG CIRCUIT

1701 F9
1710 C1
1730 A1
2701 B2
2702 B2
2703 A2
2704 B2
2705 A2
2706 A2
2707 A4
2708 B4
2709 A5
2710 B5
2711 A6
2712 B6
2713 A6
2714 B6
2715 A4
2716 C4
2717 C6
2718 D6
2719 C5
2720 D5
2721 C5
2722 D5
2723 C5
2724 D5
2725 D4
2726 D4
2727 A3
2728 E5
2729 A8
2730 B8
2733 A5
2734 C4
2735 B3
2737 A6
2738 B6
2741 D6
2742 C3
2743 F1
2744 A4
2745 F5
2746 F8
2747 E8
2760 E3
2761 B5
2762 B6
2763 B6
2765 B4
2769 F7
2770 F8
2780 F3
2781 F2
2782 F2
2784 F1
2785 F1
2786 D1
2787 D3
3701 B1
3702 C2
3703 A2
3704 B1
3705 A4
3706 B4
3707 A5
3708 B4
3709 A4
3710 C4
3711 A5
3712 B4
3713 A7
3714 B7
3715 A6
3716 B6
3717 C6
3718 E6
3719 C6
3720 E6
3721 C6
3722 D6
3723 A3
3724 D5
3725 C5
3726 D5
3727 A7
3728 B7
3729 A7
3730 B7
3731 A7
3732 B7
3733 A2
3734 B2
3735 A2
3736 B1
3741 A6
3742 C7
3743 F8
3744 F8
3745 F8
3746 E8
3748 C8
3749 C7
3751 E5
3752 F4
3753 F5
3754 E8
3755 E7
3756 D8
3757 D8
3758 D8
3759 D7
3760 A7
3761 E3
3762 E2
3763 A5
3764 A5
3765 B6
3766 B7
3767 A7
3768 E8
3769 E4
3770 F2
3771 F2
3772 F3
3773 E3
3774 E3
3775 F3
3776 F2
3777 F2
3778 E1
3779 D3
3780 D2
3781 D2
3784 D1
3786 F4
3787 C3
3788 C3
3789 F4
4790 C3
4794 C6
5701 D2
5703 F1
6770 E2
6771 E2
6772 D1
6773 D1
6774 D3
6775 C3
6776 F3
6777 E2
6778 E4
6782 C7
6785 A7
6786 B7
7710 A3
7720 A5
7730 D6
7740 A8
7780 F4
7781 F3
7782 E1
7783 E2
7784 D2
7786 C2
7787 C8
7791 F5
7792 D8
9791 A8
9792 B8
9793 A6


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
REC_L
REC_R
PLAY BACK DECK A
1730
REC/PB DECK B
1710
7710
HEF4952B
MODE SELECTOR
LEFT CHANNEL
RIGHT CHANNEL
7720
AN7323S
PB/REC AMPLIFIER
7730
HEF4952B
REC EQUALISATION
7740
HEF4952B
PLAYBACK EQUALISATION
CONTROL LOGIC
TO/FROM SHEET 1
HS
REC
CRA
CRB
1A0
2A1
2A2
+5
GND_A
GND_P
GND_M
BIAS LEVEL
ERASE OSCILLATOR
CLNS-2A833 YEZ
5703
1701
TO/FROM AF
-CMOS
TAPE-R
+12V
TAPE-L
GND_A
REC-R
REC-L
ANALOG CCTRY
DC Voltages measured with Dubbing Fe to Fe
EVM
Signal path Pb left channel
Signal path REC right channel

	A2	A1	A0	S0	S1	S2	S3	S4
STOP	0	0	0		1			1
Pb deck A	0	0	1	1				1
Pb deck B	0	1	0			1		1
--	0	1	1	1		1		1
REC in	1	0	0		1		1	
Dubbing	1	0	1	1			1	
--	1	1	0			1	1	
--	1	1	1				1	

	A2	A1	A0	S0	S1	S2	S3	S4
NS Ferro	0	0	0		1			1
HS Ferro	0	0	1	1				1
REC MUTE	0	1	0			1		1
REC MUTE	0	1	1	1		1		1
NS Chrome	1	0	0		1		1	
HS Chrome	1	0	1	1			1	
REC MUTE	1	1	0			1	1	
--	1	1	1				1	

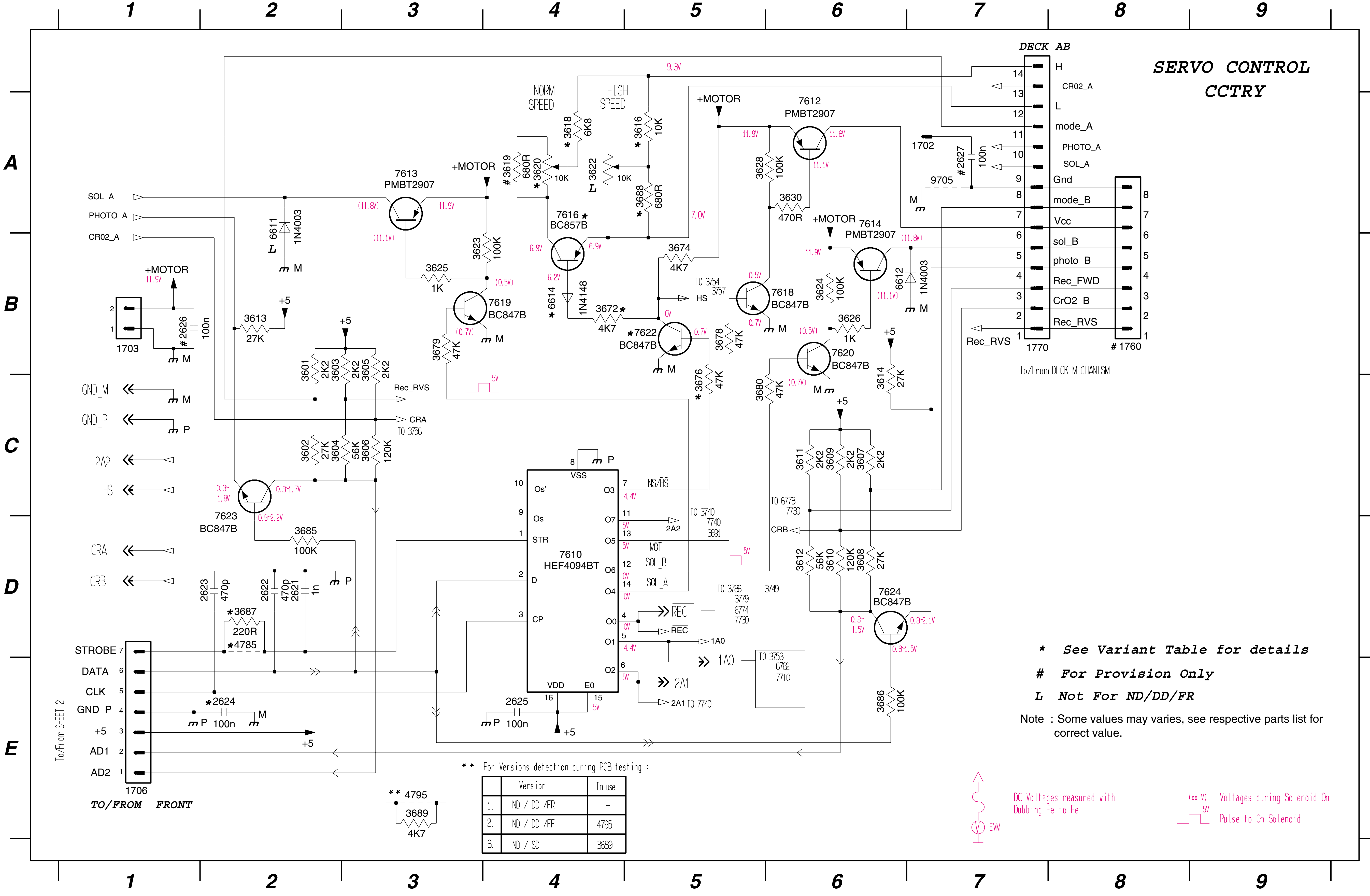
	A2	A1	A0	S0	S1	S2	S3	S4
--	0	0	0		1			1
STOP	0	0	1	1				1
--	0	1	0			1		1
REC	0	1	1	1		1		1
HS Chrome	1	0	0		1		1	
Pb Chrome	1	0	1	1			1	
--	1	1	0			1	1	
Pb Ferro	1	1	1				1	

L Not For ND/DD/FR
** See Variant Table for details*
# For Provision Only

Note : Some values may varies, see respective parts list for correct value.

SERVO CONTROL CIRCUIT

1702 A7	1760 B8	2622 D2	2625 E4	3601 B2	3604 C2	3607 C6	3610 D6	3613 B2	3618 A4	3622 A4	3625 B3	3630 A6	3676 C5	3680 C5	3687 D2	4785 D2	6612 B6	7612 A6	7616 A4	7620 B6	7624 D6
1703 B1	1770 B7	2623 D2	2626 B1	3602 C2	3605 B3	3608 D6	3611 C6	3614 C6	3619 A4	3623 B3	3626 B6	3672 B4	3678 B5	3685 D2	3688 A5	4795 E3	6614 B4	7613 A3	7618 B6	7622 B5	9705 A7
1706 E1	2621 D2	2624 E2	2627 A7	3603 B2	3606 C3	3609 C6	3612 D6	3616 A5	3620 A4	3624 B6	3628 A5	3674 B5	3679 B3	3686 E6	3689 E3	6611 A2	7610 D4	7614 A6	7619 B4	7623 D2	



1 2 3 4 5 6 7 8 9
A B C D E
SERVO CONTROL CCTRY
DECK AB
H
CR02_A
L
mode_A
PHOTO_A
SOL_A
Gnd
mode_B
Vcc
sol_B
photo_B
Rec_FWD
CrO2_B
Rec_RVS
14 13 12 11 10 9 8 7 6 5 4 3 2 1
1770
# 1760
To/From DECK MECHANISM
1702
# 2627
100n
9705
Rec_RVS
NORM SPEED
HIGH SPEED
9.3V
3618 * 6K8
3616 * 10K
# 3619 680R
3620 * 10K
3622 L 10K
3688 * 680R
+MOTOR
7612 PMBT2907
11.9V
11.8V
11.1V
3628 100K
3630 470R
7.0V
7613 PMBT2907
(11.8V)
(11.1V)
11.9V
SOL_A
PHOTO_A
CR02_A
6611 L
1N4003
M
3623 100K
3625 1K
(0.5V)
7619 BC847B
(0.7V)
3679 47K
7616 * BC857B
6.9V
6.2V
6614 *
1N4148
3672 * 4K7
3674 4K7
TO 3754 3757
HS
0V
*7622 BC847B
0.7V
7618 BC847B
0.5V
0.7V
7614 PMBT2907
(11.8V)
(11.1V)
6612
1N4003
3624 100K
3626 1K
(0.5V)
7620 BC847B
(0.7V)
3614 27K
3678 47K
3676 * 47K
3680 47K
+MOTOR
11.9V
1703
# 2626
100n
3613 27K
+5
3601 2K2
3603 2K2
3605 2K2
Rec_RVS
CRA
TO 3756
5V
GND_M
GND_P
2A2
HS
CRA
CRB
3602 27K
3604 56K
3606 120K
0.3~1.8V
0.3~1.7V
0.9~2.2V
7623 BC847B
3685 100K
2623 470p
2622 470p
2621 1n
*3687 220R
*4785
STROBE 7
DATA 6
CLK 5
GND_P 4
+5 3
AD1 2
AD2 1
1706
TO/FROM FRONT
To/From SHEET 2
*2624 100n
P
7610 HEF4094BT
VSS
Os'
Os
STR
D
CP
VDD
E0
O3
O7
O5
O6
O4
O0
O1
O2
NS/HS
4.4V
2A2
TO 3740 7740 3691
MOT
SOL_B
SOL_A
5V
0V
REC
REC
TO 3786 3779 6774 7730
3749
1A0
1A0
TO 3753 6782 7710
2A1
2A1 TO 7740
2625 100n
+5
TO 6778 7730
CRB
3611 2K2
3609 2K2
3607 2K2
3612 56K
3610 120K
3608 27K
7624 BC847B
0.3~1.5V
0.8~2.1V
0.3~1.5V
3686 100K

* See Variant Table for details

# For Provision Only

L Not For ND/DD/FR

Note : Some values may varies, see respective parts list for correct value.

** 4795

3689 4K7

** For Versions detection during PCB testing :

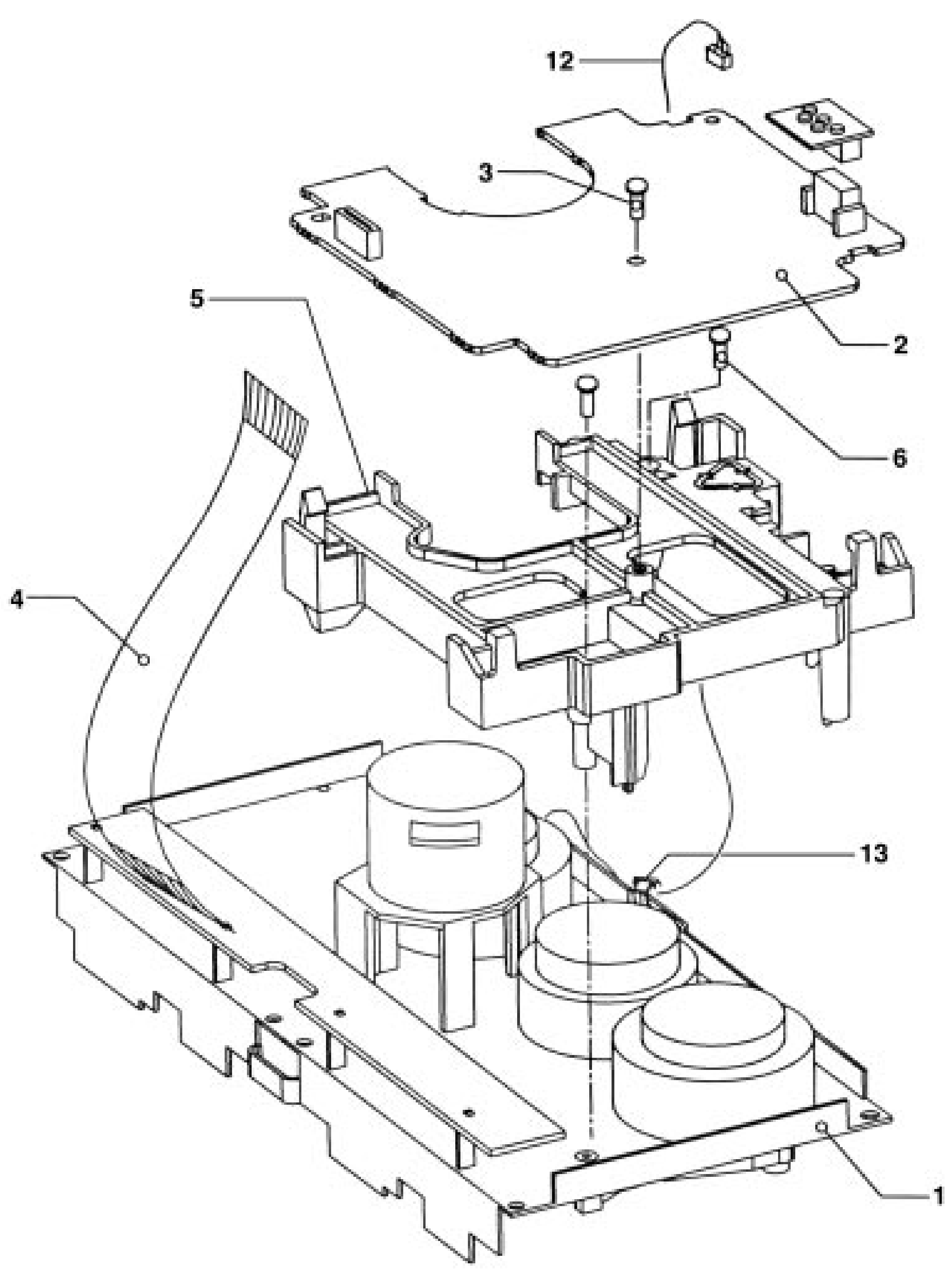
	Version	In use
1.	ND / DD /FR	–
2.	ND / DD /FF	4795
3.	ND / SD	3689

DC Voltages measured with Dubbing Fe to Fe

EVM

(xx V) Voltages during Solenoid On

5V Pulse to On Solenoid

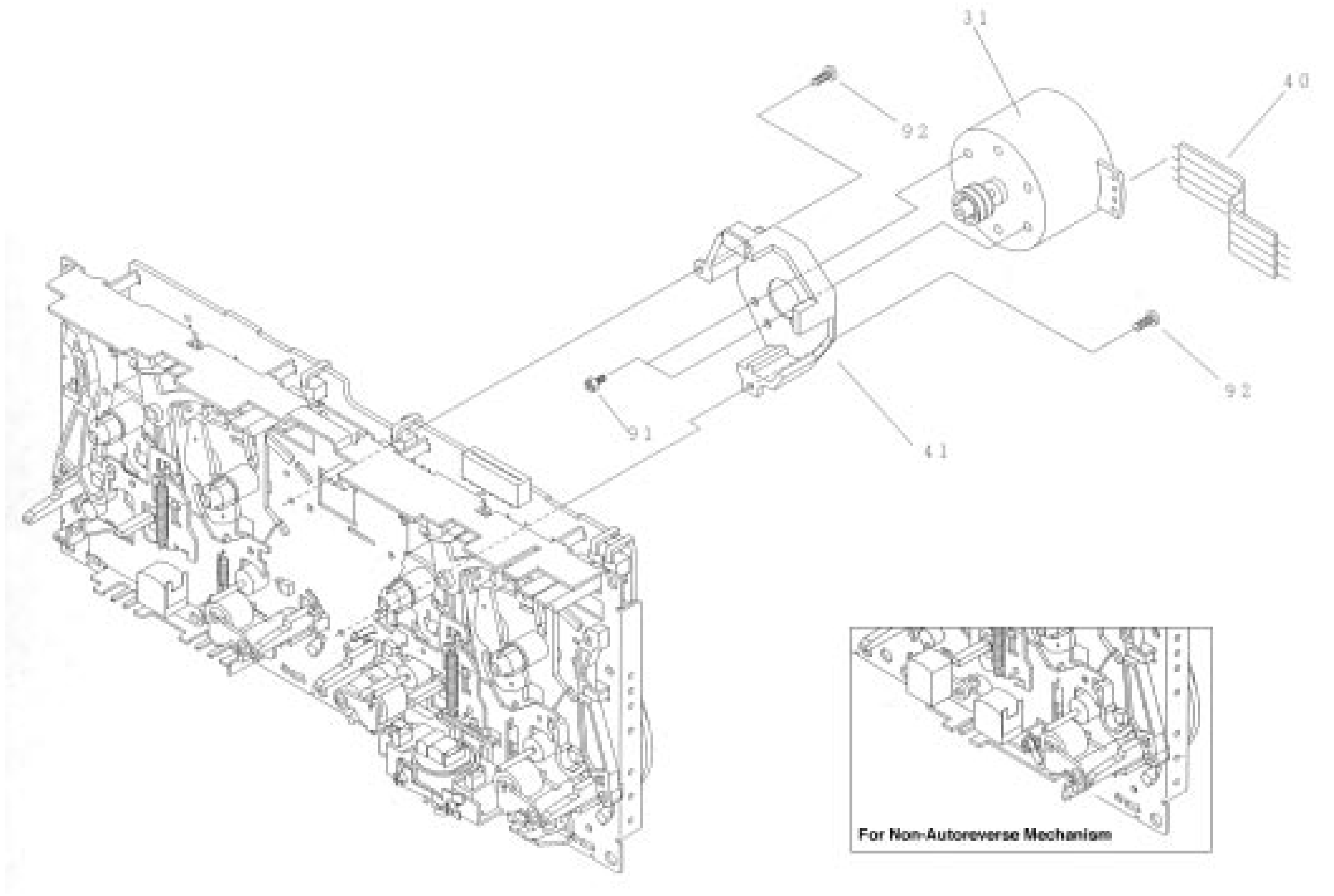


3139 118 77070 (incl. ...77080) dd wk926

TAPE MODULE EXPLODED VIEW

1	3139 118 77130	Autoreverse Mech. CWE44FR01
1	3139 118 77140	Non-Autoreverse Mech. CWE44FF02 Chrome/Ferro
1	3139 118 77950	Non-Autoreverse Mech. CWE44FF05 Ferro
3	-	Screw D3 x 10
6	-	Screw M2 x 16
7	3139 110 34080	Flex Cable 14 pin 7,5 cm

Note: Only the parts mentioned in this list are normal service spare parts.



TAPE MECHANISM - MOTOR EXPLODED VIEW

31	4822 361 11055	Motor Assembly
91	-	Screw M2,6 x 5
92	-	Screw M2 x 5

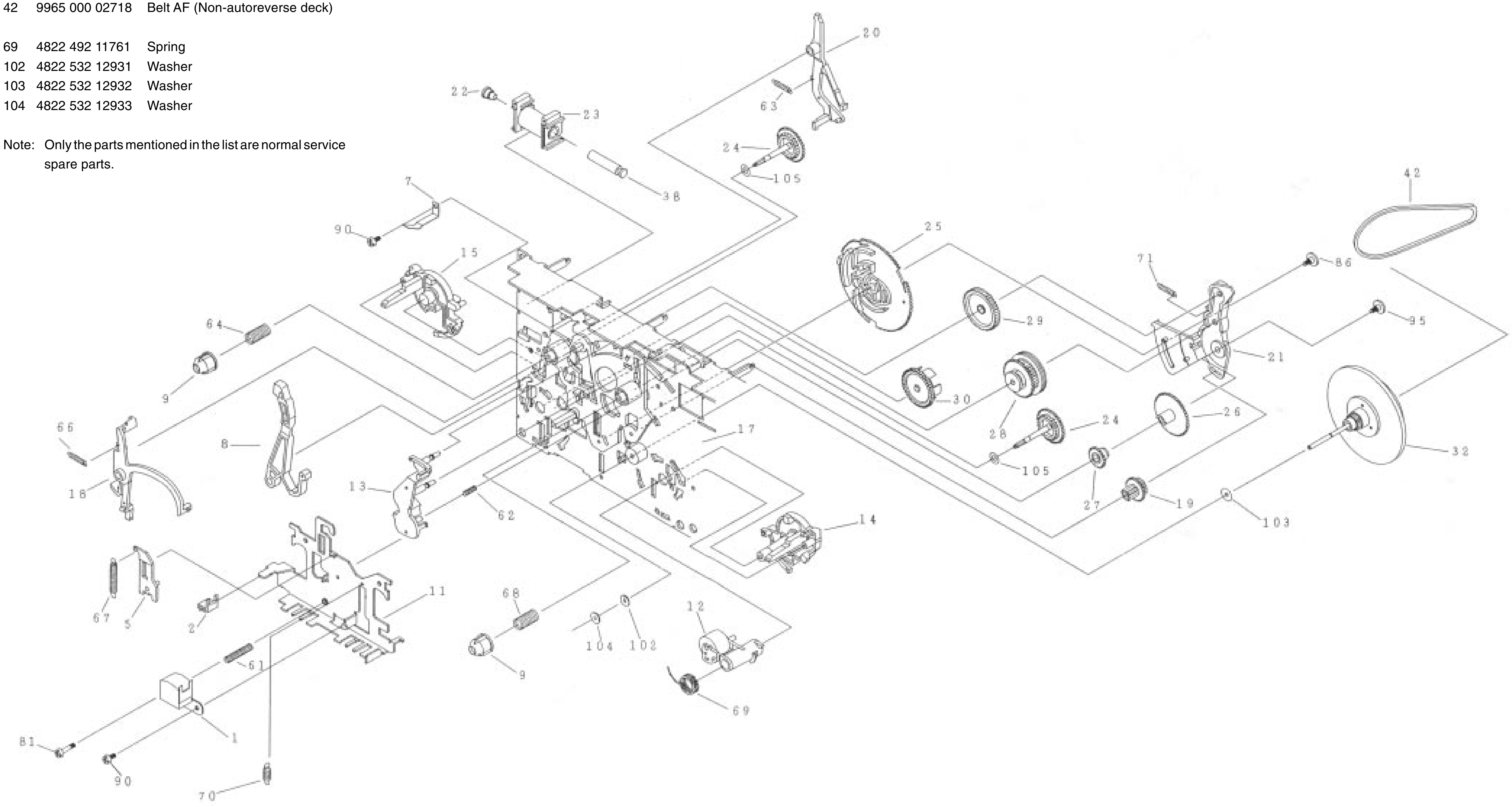
Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM A - PLAY

MECHANICAL PARTS - PLAY MECHANISM

1	9965 000 02313	Play Head (Non-Autoreverse deck)
1	9965 000 02321	Play Head (Autoreverse deck)
12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
42	9965 000 02315	Belt AF (Autoreverse deck)
42	9965 000 02718	Belt AF (Non-autoreverse deck)
69	4822 492 11761	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

Note: Only the parts mentioned in the list are normal service spare parts.

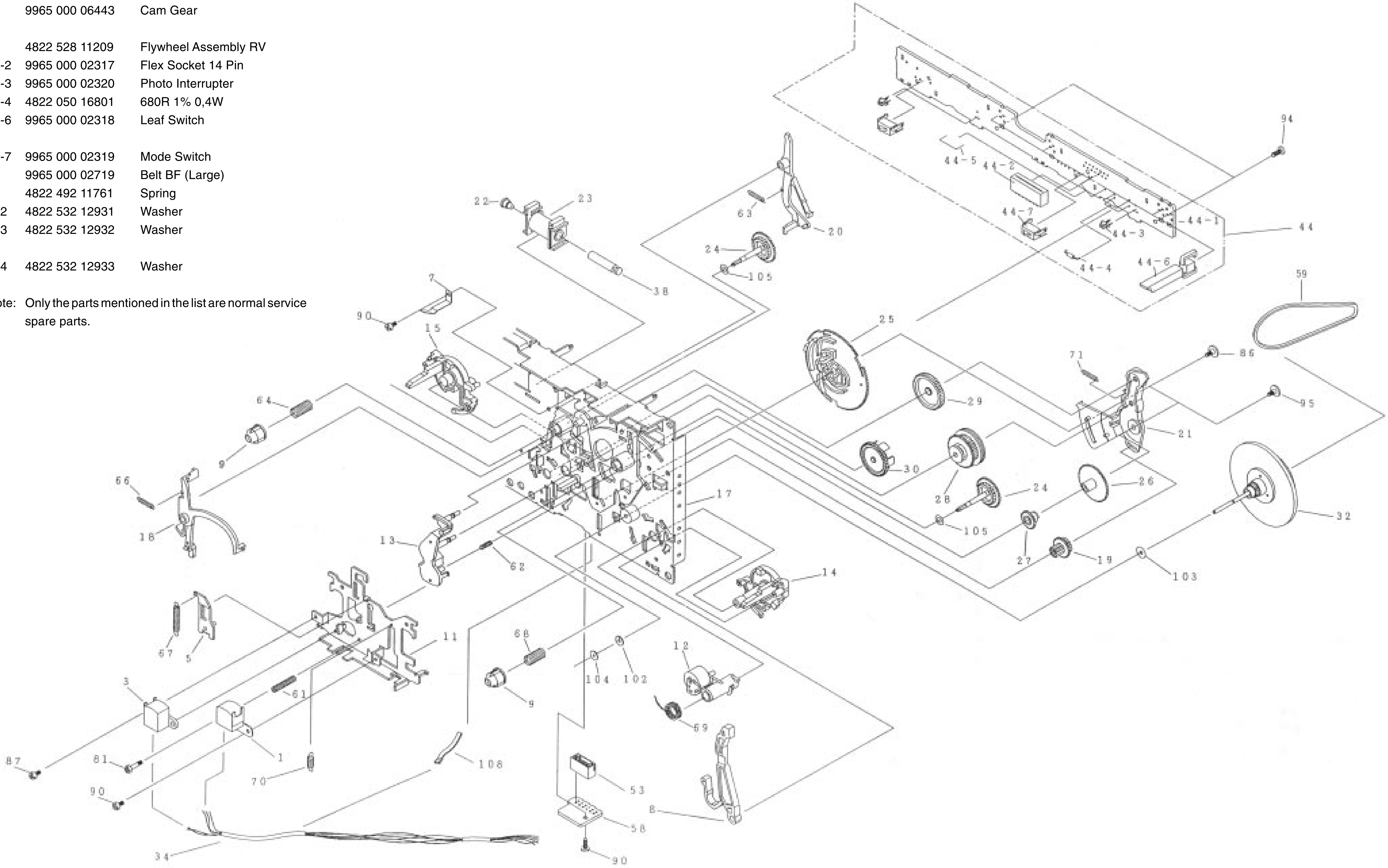

20
22
23
63
24
105
38
7
90
42
25
15
71
86
95
64
29
9
21
30
26
28
24
66
8
17
32
105
13
18
27
19
62
103
14
67
5
2
11
68
12
104
102
61
9
69
81
1
90
70

TAPE MECHANISM B - RECORD/PLAYBACK *(Non-Autoreverse version)*

MECHANICAL PARTS - REC/PB MECHANISM

1	9965 000 02313	Play Head
3	9965 000 02600	Head, Erase
12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
44-2	9965 000 02317	Flex Socket 14 Pin
44-3	9965 000 02320	Photo Interrupter
44-4	4822 050 16801	680R 1% 0,4W
44-6	9965 000 02318	Leaf Switch
44-7	9965 000 02319	Mode Switch
59	9965 000 02719	Belt BF (Large)
69	4822 492 11761	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

Note: Only the parts mentioned in the list are normal service spare parts.

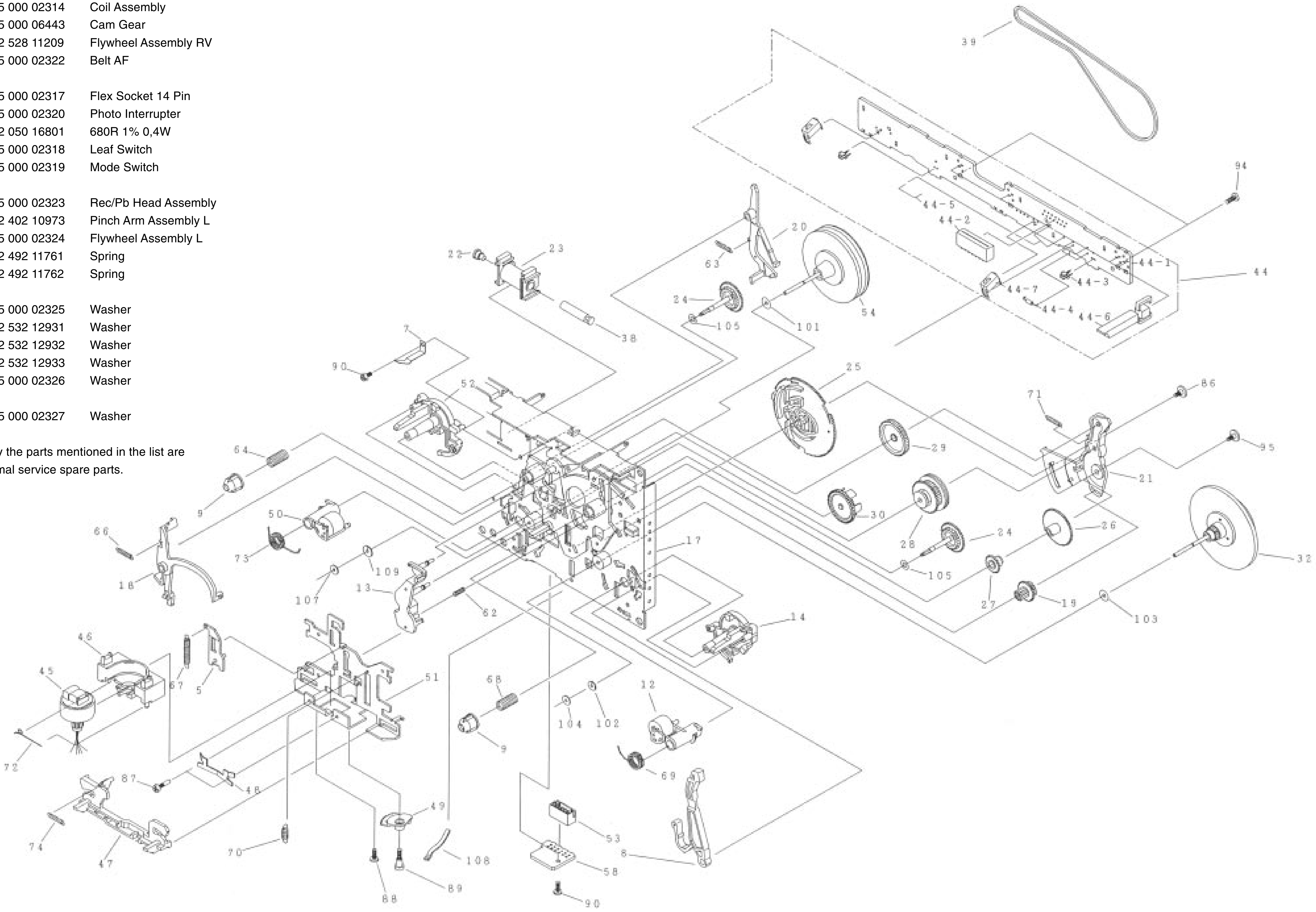

94
44-5
44-2
44-7
44-1
44
44-3
44-4
44-6
59
22
23
63
20
24
105
38
7
90
15
25
71
86
95
29
21
64
9
66
30
28
24
26
32
17
18
13
105
27
19
103
62
14
11
68
12
67
5
104
102
3
61
9
69
1
87
81
70
108
53
90
8
58
34
90

TAPE MECHANISM B - RECORD/PLAYBACK *(Autoreverse version)*

MECHANICAL PARTS - REC/PB MECHANISM

12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
39	9965 000 02322	Belt AF
44-2	9965 000 02317	Flex Socket 14 Pin
44-3	9965 000 02320	Photo Interrupter
44-4	4822 050 16801	680R 1% 0,4W
44-6	9965 000 02318	Leaf Switch
44-7	9965 000 02319	Mode Switch
45	9965 000 02323	Rec/Pb Head Assembly
50	4822 402 10973	Pinch Arm Assembly L
54	9965 000 02324	Flywheel Assembly L
69	4822 492 11761	Spring
73	4822 492 11762	Spring
101	9965 000 02325	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
107	9965 000 02326	Washer
109	9965 000 02327	Washer

Note: Only the parts mentioned in the list are normal service spare parts.


39
94
44-5
44-2
44-1
44
44-3
44-7
44-4
44-6
20
63
23
22
24
105
101
54
38
7
90
52
25
71
86
95
29
21
64
9
50
66
73
109
107
13
18
30
28
24
26
32
17
105
27
19
103
62
14
46
45
67
5
51
68
12
104
102
72
9
69
87
48
49
74
47
70
53
108
8
58
88
89
90

MISCELLANEOUS

1701	482226710953	Flex Socket 7pin Vert.
1706	482226710953	Flex Socket 7pin Vert.
1770	482226751255	Flex Socket 14pin Vert.

CAPACITORS

2621	532212231647	1nF 10% 63V	
2622	532212234099	470pF 10% 63V	
2623	532212234099	470pF 10% 63V	
2624	482212614585	100nF 10% 50V	only for Ferro
2625	482212614585	100nF 10% 50V	
2701	532212233538	150pF 2% 63V	Autoreverse
2701	482212233216	270pF 5% 63V	Non-autoreverse
2702	532212233538	150pF 2% 63V	Autoreverse
2702	482212233216	270pF 5% 63V	Non-autoreverse
2703	532212232531	100pF 5% 50V	Autoreverse
2703	482212233575	220pF 5% 63V	Non-autoreverse
2704	532212232531	100pF 5% 50V	Autoreverse
2704	482212233575	220pF 5% 63V	Non-autoreverse
2705	482212233575	220pF 5% 63V	
2706	482212233575	220pF 5% 63V	
2707	532212234099	470pF 10% 63V	
2708	532212234099	470pF 10% 63V	
2709	532212231863	330pF 5% 63V	
2710	532212231863	330pF 5% 63V	
2711	532212232531	100pF 5% 50V	
2712	532212232531	100pF 5% 50V	
2713	482212440248	10µF 20% 63V	
2714	482212440248	10µF 20% 63V	
2715	482212480195	470µF 20% 10V	
2716	482212480195	470µF 20% 10V	
2717	482212233177	10nF 20% 50V	Autoreverse
2717	482212613188	15nF 5% 63V	Non-autoreverse
2718	482212233177	10nF 20% 50V	Autoreverse
2718	482212613188	15nF 5% 63V	Non-autoreverse
2719	482212612105	33nF 5% 50V	
2720	482212612105	33nF 5% 50V	
2721	532212231866	6,8nF 10% 63V	not for Ferro
2722	532212231866	6,8nF 10% 63V	not for Ferro
2723	482212613188	15nF 5% 63V	
2724	482212613188	15nF 5% 63V	
2725	532212610223	4,7nF 10% 63V	
2726	532212610223	4,7nF 10% 63V	
2727	532212234099	470pF 10% 63V	Autoreverse
2727	532212231647	1nF 10% 63V	Non-autoreverse
2728	532212234099	470pF 10% 63V	Autoreverse
2728	532212231647	1nF 10% 63V	Non-autoreverse
2729	532212232654	22nF 10% 63V	
2730	532212232654	22nF 10% 63V	
2733	532212234099	470pF 10% 63V	
2734	532212234099	470pF 10% 63V	
2735	482212614585	100nF 10% 50V	
2737	482212614585	100nF 10% 50V	
2738	482212614585	100nF 10% 50V	
2741	482212611585	22nF +80/-20% 25V	
2742	532212232654	22nF 10% 63V	
2743	532212232654	22nF 10% 63V	
2744	482212614585	100nF 10% 50V	
2760	482212614585	100nF 10% 50V	
2761	482212480144	220µF 20% 25V	
2762	482212440769	4,7µF 20% 100V	
2763	482212440433	47µF 20% 25V	
2765	482212440433	47µF 20% 25V	
2769	532212234099	470pF 10% 63V	
2770	532212234099	470pF 10% 63V	
2780	482212481151	22µF 20% 50V	
2781	482212233177	10nF 20% 50V	
2782	532212610223	4,7nF 10% 63V	
2784	482212151305	15nF 10% 50V	
2785	482212421913	1µF 20% 63V	
2786	532212232531	100pF 5% 50V	
2787	482212612105	33nF 5% 50V	

RESISTORS

3601	482211711449	2k2 1% 0,1W	
3602	482205120273	27k 5% 0,1W	
3603	482211711449	2k2 1% 0,1W	
3604	482211711148	56k 1% 0,1W	
3605	482211711449	2k2 1% 0,1W	
3606	482205120124	120k 5% 0,1W	
3607	482211652256	2k2 5% 0,5W	
3608	482205120273	27k 5% 0,1W	
3609	482211652256	2k2 5% 0,5W	
3610	482205120124	120k 5% 0,1W	
3611	482211652256	2k2 5% 0,5W	
3612	482211711148	56k 1% 0,1W	
3613	482205120273	27k 5% 0,1W	
3614	482205120273	27k 5% 0,1W	
3616	482211710833	10k 1% 0,1W	Autoreverse
3616	482205110102	1k 2% 0,25W	Non-autoreverse
3618	482211711507	6k8 1% 0,1W	Autoreverse
3620	482210011141	Trim. 10k 30%	Autoreverse
3622	482210011141	Trim. 10k 30%	Non-autoreverse
3623	482211710837	100k 1% 0,1W	
3624	482211710837	100k 1% 0,1W	
3625	482205110102	1k 2% 0,25W	
3626	482205110102	1k 2% 0,25W	
3628	482211710837	100k 1% 0,1W	
3630	482205120471	470R 5% 0,1W	
3672	482205120472	4k7 5% 0,1W	Autoreverse
3674	482211652283	4k7 5% 0,5W	
3676	482211710834	47k 1% 0,1W	Autoreverse
3678	482211710834	47k 1% 0,1W	
3679	482211710834	47k 1% 0,1W	
3680	482211710834	47k 1% 0,1W	
3685	482211652234	100k 5% 0,5W	
3686	482211710837	100k 1% 0,1W	
3687	482211711503	220R 1% 0,1W	not for Ferro
3688	482211710361	680R 1% 0,1W	Autoreverse
3701	482211711503	220R 1% 0,1W	
3702	482211711503	220R 1% 0,1W	
3703	482211711503	220R 1% 0,1W	
3704	482211711503	220R 1% 0,1W	
3705	482211711503	220R 1% 0,1W	
3706	482211711503	220R 1% 0,1W	
3707	482205120101	100R 5% 0,1W	
3708	482205120101	100R 5% 0,1W	
3709	482205120109	10R 5% 0,1W	
3710	482205120109	10R 5% 0,1W	
3711	482205120154	150k 5% 0,1W	
3712	482205120154	150k 5% 0,1W	
3713	482205120109	10R 5% 0,1W	
3714	482205120109	10R 5% 0,1W	
3715	482205120182	1k8 5% 0,1W	
3716	482205120182	1k8 5% 0,1W	
3717	482211711449	2k2 1% 0,1W	
3718	482211711449	2k2 1% 0,1W	
3719	482211711383	12k 1% 0,1W	
3720	482211711383	12k 1% 0,1W	
3721	482205120392	3k9 5% 0,1W	
3722	482205120392	3k9 5% 0,1W	
3723	482211683933	15k 1% 0,1W	Autoreverse
3723	482211710965	18k 1% 0,1W	Non-autoreverse
3724	482211683933	15k 1% 0,1W	Autoreverse
3724	482211710965	18k 1% 0,1W	Non-autoreverse
3725	482205120109	10R 5% 0,1W	not for Ferro
3726	482205120109	10R 5% 0,1W	not for Ferro
3727	482205120562	5k6 5% 0,1W	Autoreverse
3727	482211711507	6k8 1% 0,1W	Non-autoreverse
3728	482205120562	5k6 5% 0,1W	Autoreverse
3728	482211711507	6k8 1% 0,1W	Non-autoreverse
3729	482205120332	3k3 5% 0,1W	Autoreverse
3729	482205120472	4k7 5% 0,1W	Non-autoreverse
3730	482205120332	3k3 5% 0,1W	Autoreverse
3730	482205120472	4k7 5% 0,1W	Non-autoreverse
3731	482205120822	8k2 5% 0,1W	
3732	482205120822	8k2 5% 0,1W	
3733	482205120122	1k2 5% 0,1W	
3734	482205120122	1k2 5% 0,1W	
3735	482205120223	22k 5% 0,1W	
3736	482205120223	22k 5% 0,1W	
3741	482211711449	2k2 1% 0,1W	
3742	482211711449	2k2 1% 0,1W	
3743	482211711139	1k5 1% 0,1W	Autoreverse
3743	482211711449	2k2 1% 0,1W	Non-autoreverse
3744	482211711139	1k5 1% 0,1W	Autoreverse
3744	482211711449	2k2 1% 0,1W	Non-autoreverse
3745	482205120332	3k3 5% 0,1W	Autoreverse
3745	482205120562	5k6 5% 0,1W	Non-autoreverse
3746	482205120332	3k3 5% 0,1W	Autoreverse
3746	482205120562	5k6 5% 0,1W	Non-autoreverse
3748	482211711449	2k2 1% 0,1W	
3749	482211710834	47k 1% 0,1W	
3751	482211710833	10k 1% 0,1W	
3752	482211710837	100k 1% 0,1W	
3753	482211710837	100k 1% 0,1W	
3754	482205120105	1M 5% 0,1W	Autoreverse
3754	482205120479	47R 5% 0,1W	Non-autoreverse
3755	482205120105	1M 5% 0,1W	Autoreverse
3755	482205120479	47R 5% 0,1W	Non-autoreverse
3756	482211713579	220k 1% 0,1W	
3757	482211713579	220k 1% 0,1W	
3758	482211710833	10k 1% 0,1W	
3759	482211710833	10k 1% 0,1W	
3760	482205120121	120R 5% 0,1W	
3761	482205021003	10k 1% 0,6W	
3762	482211711454	820R 1% 0,1W	
3763	482205120154	150k 5% 0,1W	
3764	482211683872	220R 5% 0,5W	
3765	482205120393	39k 5% 0,1W	
3766	482205120475	4M7 5% 0,1W	
3767	482205120475	4M7 5% 0,1W	
3768	482211710833	10k 1% 0,1W	
3769	482211711383	12k 1% 0,1W	Autoreverse
3769	482205120822	8k2 5% 0,1W	Non-autoreverse
3770	482211711139	1k5 1% 0,1W	
3771	482205120122	1k2 5% 0,1W	
3772	482211711507	6k8 1% 0,1W	Autoreverse
3772	482205120562	5k6 5% 0,1W	Non-autoreverse
3773	482210012227	Trimmer 4k7 30% 0,1W	
3774	482211683933	15k 1% 0,1W	Autoreverse
3774	482205120822	8k2 5% 0,1W	Non-autoreverse
3775	482205120478	4R7 5% 0,1W	
3776	482211711507	6k8 1% 0,1W	
3777	482211710353	150R 1% 0,1W	
3778	482205210688	⚠ 6R8 5% 0,33W	
3779	482205120334	330k 5% 0,1W	
3780	482205120105	1M 5% 0,1W	
3781	482205120475	4M7 5% 0,1W	
3784	482205110102	1k 2% 0,25W	
3786	482205120223	22k 5% 0,1W	
3787	482205120105	1M 5% 0,1W	
3788	482205120105	1M 5% 0,1W	
3789	482211710834	47k 1% 0,1W	
4701	482205120008	0R Jumper 0805	
4702	482205120008	0R Jumper 0805	
4703	482205120008	0R Jumper 0805	
4704	482205120008	0R Jumper 0805	
4705	482205120008	0R Jumper 0805	

ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

RESISTORS

4706	482205120008	0R Jumper 0805	
4707	482205120008	0R Jumper 0805	
4708	482205120008	0R Jumper 0805	
4709	482205120008	0R Jumper 0805	
4710	482205120008	0R Jumper 0805	
4711	482205120008	0R Jumper 0805	
4712	482205120008	0R Jumper 0805	
4713	482205120008	0R Jumper 0805	
4714	482205120008	0R Jumper 0805	
4715	482205120008	0R Jumper 0805	
4716	482205120008	0R Jumper 0805	
4717	482205120008	0R Jumper 0805	
4718	482205120008	0R Jumper 0805	
4719	482205120008	0R Jumper 0805	
4720	482205120008	0R Jumper 0805	
4721	482205120008	0R Jumper 0805	
4722	482205120008	0R Jumper 0805	
4723	482205120008	0R Jumper 0805	
4724	482205120008	0R Jumper 0805	
4725	482205120008	0R Jumper 0805	
4726	482205120008	0R Jumper 0805	
4727	482205120008	0R Jumper 0805	
4728	482205120008	0R Jumper 0805	
4729	482205120008	0R Jumper 0805	
4730	482205120008	0R Jumper 0805	
4731	482205120008	0R Jumper 0805	
4732	482205120008	0R Jumper 0805	
4733	482205120008	0R Jumper 0805	
4734	482205120008	0R Jumper 0805	
4735	482205120008	0R Jumper 0805	
4736	482205120008	0R Jumper 0805	
4737	482205120008	0R Jumper 0805	
4738	482205120008	0R Jumper 0805	
4739	482205120008	0R Jumper 0805	
4740	482205120008	0R Jumper 0805	
4741	482205120008	0R Jumper 0805	
4742	482205120008	0R Jumper 0805	
4744	482205120008	0R Jumper 0805	
4745	482205120008	0R Jumper 0805	
4746	482205120008	0R Jumper 0805	
4748	482205120008	0R Jumper 0805	
4785	482205120008	0R Jumper 0805	only for Ferro
4790	482205120008	0R Jumper 0805	
4794	482205120008	0R Jumper 0805	
4795	482205120008	0R Jumper 0805	

COILS & FILTERS

5701	482215711477	Coil 2,2µH 5%
5703	482215620946	Osc Coil 100kHz

DIODES

6611	482213031878	1N4003G	
6612	482213031878	1N4003G	
6614	482213030621	1N4148	Autoreverse
6770	482213030621	1N4148	
6771	482213030621	1N4148	
6772	482213030621	1N4148	
6773	482213030621	1N4148	
6774	482213030621	1N4148	
6775	482213030621	1N4148	
6776	482213030621	1N4148	
6777	482213034382	BZX79-F8V2	
6778	482213030621	1N4148	
6782	482213030621	1N4148	
6785	482213030621	1N4148	
6786	482213030621	1N4148	

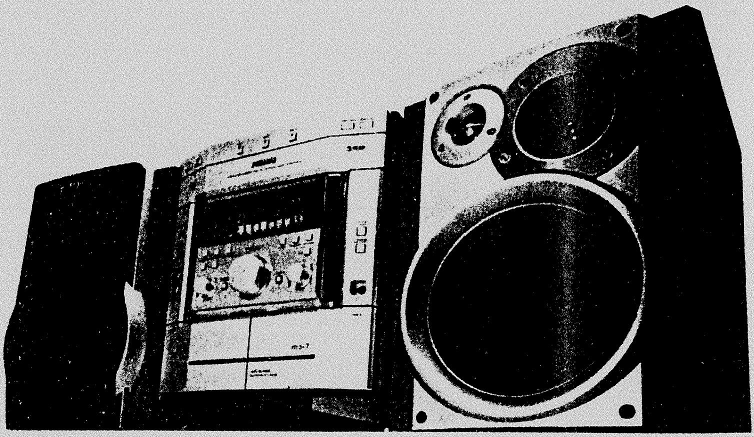
TRANSISTORS & INTEGRATED CIRCUITS

7610	532220911306	HEF4094BT	
7612	482213011201	PMBT2907	
7613	482213011201	PMBT2907	
7614	482213011201	PMBT2907	
7616	482213060373	BC857B	Autoreverse
7618	482213060511	BC847B	
7619	482213060511	BC847B	
7620	482213060511	BC847B	
7622	482213060511	BC847B	Autoreverse
7623	482213060511	BC847B	
7624	482213060511	BC847B	
7710	482220932919	HEF4952BT	
7720	932214000668	AN7323S	
7730	482220932919	HEF4952BT	
7740	482220932919	HEF4952BT	
7780	482213060511	BC847B	
7781	482213042804	BC817-25	
7782	482213044568	BC557B	
7783	482213060511	BC847B	
7784	482213060373	BC857B	
7786	482213063494	J111	
7787	482213060511	BC847B	
7791	482213060511	BC847B	
7792	482213060511	BC847B	

Note: Only the parts mentioned in this list are normal service spare parts.

Mini System **MZ7/22/37**

Service
Service
Service



Service Manual

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CLASS 1
LASER PRODUCT

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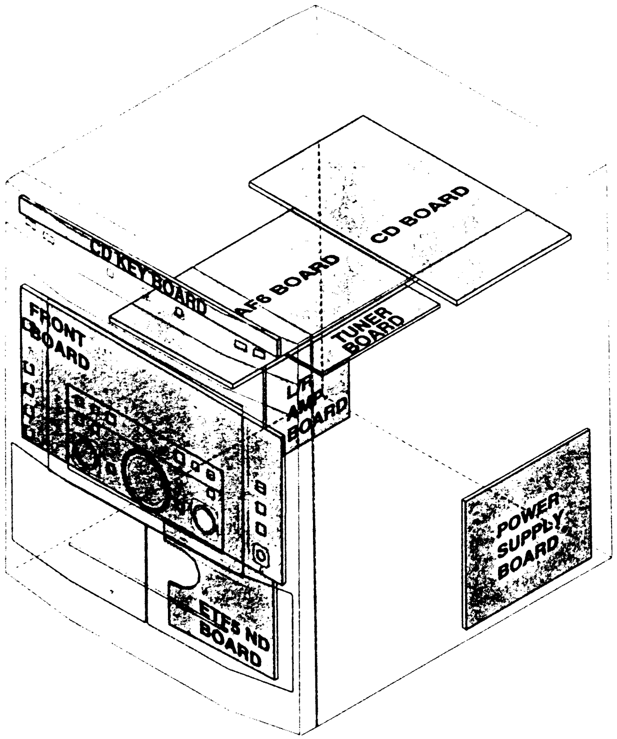
GB 3139 115 50140

PCS 102 799

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS



VERSION VARIATIONS:

Type /Versions:	MZ7							
Features & Board in used:	/22	/37						
Aux In	x	x						
Line Out	x	x						
Surround Out								
Subwoofer Out	x	x						
Digital Out	x	x						
Matrix Surround								
CD Text								
Dolby B								
RDS	x							
News	x							
Incredible Surround	x	x						
Karaoke Features								
Voltage Selector								
Low Power Standby / LED								
Tuner board - ECO5 Sys		x						
Tuner board - Tuner 95	x							
Surround Loudspeakers								

SPECIFICATIONS

GENERAL:

Mains voltage : 100V for /26
110-127V/220-240V Switchable for /21/21M
120V for /37
220V for /33
220-230V for /22/34
230V for /25
230-240V for /30
Mains frequency : 50/60Hz
Power consumption : < 15W at Standby
< 75W at 1/8 rated power out
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 390mm

TUNER:

FM

Tuning range : 87.5-108MHz
65.81-74MHz for /34
Grid : 50kHz (& 30kHz for /34)
IF frequency : 10.7MHz ± 25kHz
Aerial input : 75ohm coaxial
300ohm click fit for /37
Sensitivity at 26dB S/N : < 7µV
Selectivity at 600kHz bandwidth : > 50dB
Image rejection : > 25dB [> 75dB]
Distortion at RF=1mV, dev. 75kHz : < 3% [< 2%]
-3dB Limiting point : < 7µV
Crosstalk at RF=1mV, dev. 40kHz : > 18dB [> 26dB]

MW

Tuning range : 531-1602kHz
530-1700kHz for /21/21M/37
Grid : 9kHz
10kHz for /21/21M/37
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : < 4.0mV/M
Selectivity at 18kHz bandwidth : > 18dB
IF rejection : > 45dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5% [< 7%]

LW

Tuning range : 153-279kHz
Grid : 3kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : [< 7.0mV/M]
Selectivity at 18kHz bandwidth : [> 24dB]
IF rejection : [> 26dB]
Image rejection : [> 35dB]
Distortion at RF=50mV, m=80% : [< 7%]

AMPLIFIER:

Output power (6ohm, 1kHz, 10% THD)
L & R : 2 x 50W

Frequency response within -3dB : 60Hz-16kHz
Incredible Surround : ON / OFF
Bass : + / - 3 steps
Treble : + / - 3 steps
Loudness : ON / OFF

Headphone output at 32 ohm : 15mW ± 2dB

Input sensitivity
Aux in : 500mV ± 2dB at 1 kohm
Output sensitivity
Line out : 500mV ± 2dB at 22 kohm
Subwoofer out (max. vol.) : 1.5V ± 2dB at 22 kohm

CASSETTE RECORDER:

Number of track : 2 x 2 stereo
Tape speed : 4.76cm/sec -0.8/+1.8%
1.6 x 4.76 cm/sec
Wow and flutter : < 0.35% (IEC)
Fast-wind/Rewind time C60 : 130 sec
Bias system : 75kHz ± 10kHz
Rec/Pb freq. response within 4dB (IEC I) : 250Hz - 12.5kHz
Rec/Pb freq. response within 4dB (IEC II): 80Hz - 12.5kHz
Signal to noise ratio (IEC I) : > 44dB
Signal to noise ratio (IEC II) : > 47dB

COMPACT DISC:

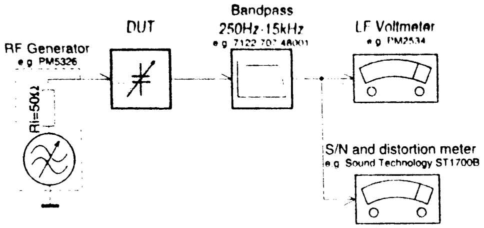
Measurement done at output conn. of the CDC module.
Frequency response within ± 1.5dB : 20Hz - 20kHz
Output level (in Vrms) : 550mV ± 1dB unloaded
Signal/Noise ratio (A-weighted) : > 80dBA
Distortion at 1kHz : < 0.5%
Channel difference at 1kHz : < 1dB
Channel crosstalk at 1kHz : > 60dB
De-emphasis : 0 or 15/50 mS (Switched by subcode on the disc)

[....] Values indicated are for "Tuner 95 Board" only

[1] Frequency response in each setting is software controlled.

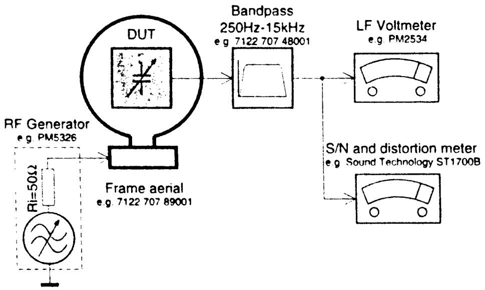
MEASUREMENT SETUP

Tuner FM


RF Generator
e.g. PM5326
Ri=50Ω
DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

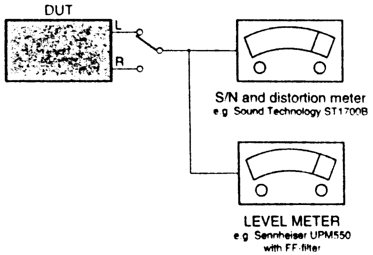
Tuner AM (MW,LW)


DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
Frame aenal
e.g. 7122 707 89001
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday's cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

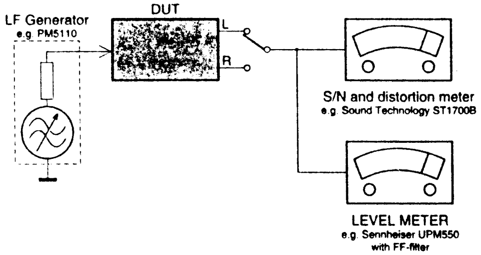
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)


DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071


LF Generator
e.g. PM5110
DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

SERVICE AIDS

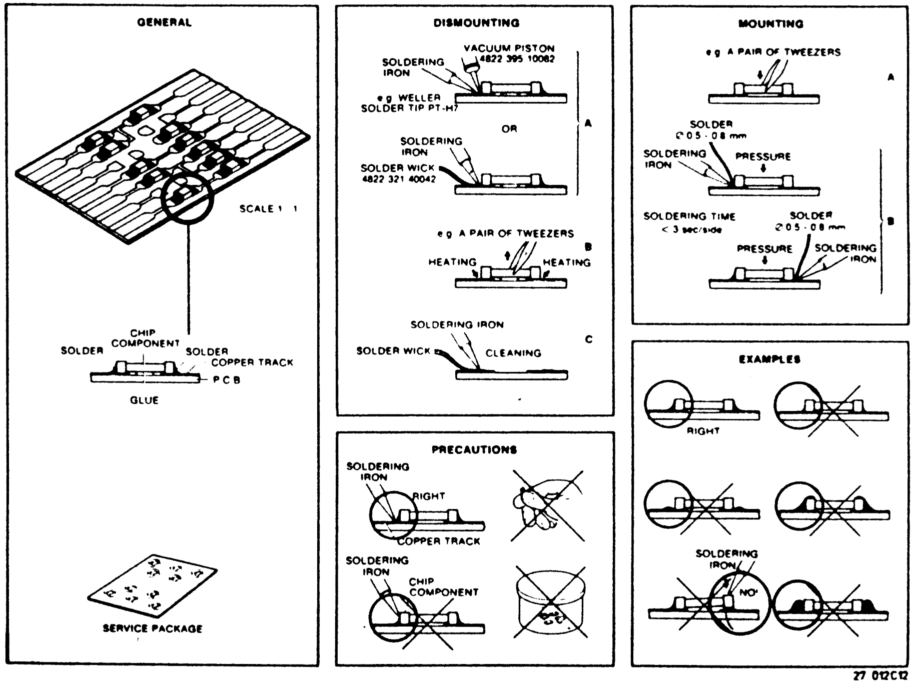
Service Tools:	
Universal Torx driver holder	4822 395 91019
Torx bit T10 150mm	4822 395 50456
Torx driver set T6 - T20	4822 395 50145
Torx driver T10 extended	4822 395 50423

Cassette:	
SBC419 Test cassette CrO2	4822 397 30069
SBC420 Test cassette Fe	4822 397 30071
MTT150 Dolby level 200nWb/M	4822 397 30271

Compact Disc:	
SBC426/426A Test disc 5 + 5A	4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz	4822 397 30155
SBC429 Audio Signals disc	4822 397 30184
Dolby Pro-logic Test Disc	4822 395 10216

ESD Equipment:	
Anti-static table mat - large 1200x650x1.25mm	4822 466 10953
Anti-static table mat - small 600x650x1.25mm	4822 466 10958
Anti-static wristband	4822 395 10223
Connector box (1MΩ)	4822 320 11307
Extension cable (to connect wristband to conn. box)	4822 320 11305
Connecting cable (to connect table mat to conn. box)	4822 320 11306
Earth cable (to connect product to mat or box)	4822 320 11308
Complete kit ESD3 (combining all above products)	4822 320 10671
Wristband tester	4822 344 13999

HANDLING CHIP COMPONENTS


GENERAL
SCALE 1 : 1
SOLDER
CHIP COMPONENT
SOLDER
COPPER TRACK
PCB
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON
4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
SOLDERING IRON
SOLDER WICK
4822 321 40042
A
e.g. A PAIR OF TWEEZERS
HEATING
HEATING
B
SOLDERING IRON
SOLDER WICK
CLEANING
C
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER
Ø 0.5 - 0.8 mm
SOLDERING IRON
PRESSURE
SOLDERING TIME
< 3 sec/side
SOLDER
Ø 0.5 - 0.8 mm
PRESSURE
SOLDERING IRON
B
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
EXAMPLES
RIGHT
SOLDERING IRON
NO!
27 012C12

ESD

GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

D WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

NL WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used

NL

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

F

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.

D

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; fur Reparaturen sind Original-Ersatzteile zu verwenden.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

CLASS 1
LASER PRODUCT

GB Warning !

Invisible laser radiation when open.
Avoid direct exposure to beam.

S Varning !

Osynlig laserstrålning når apparaten år öppnad och spårren år urkopplad. Betrakta ej strålen.

SF Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen!

DK Advarsel !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling

---

General Information

- ***The typeplate (which contains the serial number) is located at the rear of the system.***
- ***Recording is permissible if copyright or other rights of third parties are not infringed.***
- ***This product complies with the radio interference requirements of the European Community.***

Environmental Information

All unnecessary packaging has been omitted. We have tried to make the packaging easy to separate into three materials: cardboard (box), polystyrene foam (buffer) and polyethylene (bags, protective foam sheet)

Your system consists of materials which can be recycled and reused if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment

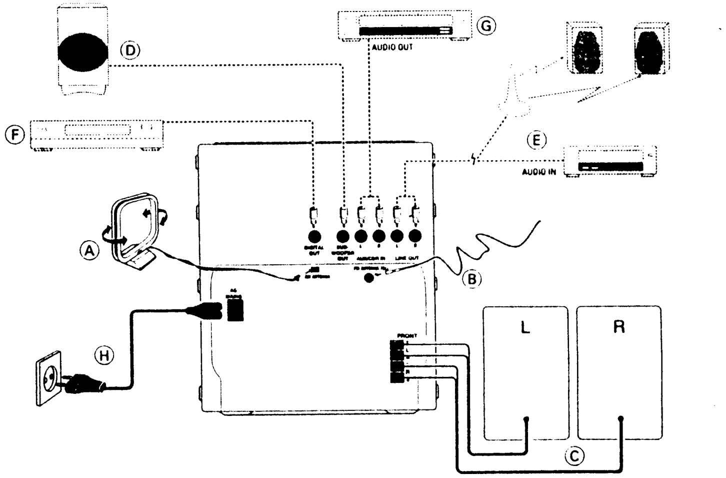
Accessories *(Supplied)*

- Remote control
- Batteries (two AA size) for remote control
- AM loop antenna
- FM wire antenna
- AC power cord

Safety Information

- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer The typeplate is located at the rear of your system
- When the system is switched on, do not move it around
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system
- The system incorporates a built in safety feature that prevents over heating
- Do not expose the system to excessive moisture, rain, sand or heat sources
- Under no circumstances should you repair the system yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the system until normal playback is possible
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- **To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

Rear Connections



Ⓐ AM Loop Antenna Connection

Connect the supplied loop antenna to the AM ANTENNA terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

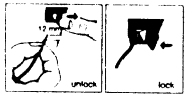
Ⓑ FM Wire Antenna Connection

Connect the supplied FM wire antenna to the FM ANTENNA 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

Outdoor Antenna
For better FM stereo reception connect an outdoor FM antenna to the FM ANTENNA 75 Ω terminal using a 75 Ω coaxial wire.

Ⓒ Speakers Connection

- Connect the right speaker to Front terminal R with the red wire to + and the black wire to –
- Connect the left speaker to Front terminal L with the red wire to + and the black wire to –
- Clip the stripped portion of the speaker wire as shown.



Ⓓ Subwoofer Out Connection

Connect the optional active subwoofer to the SUBWOOFER OUT terminal. The subwoofer reproduces just the low bass effect (e.g. explosions, the rumble of spaceships, etc.). Be sure to follow the instructions supplied with the subwoofer.

Ⓔ Line Out Connection *(wireless ready)*

You can connect the audio left and right LINE OUT terminals to a optional CD Recorder ANALOGUE IN terminals. This allows you to record in an analogue format.

You can also install additional optional front active speakers away from the system (e.g. in another room) to reduce the inconvenience of running long speaker wires across rooms. You can place as many remote speakers as you like provided they operate at the same radio frequency. Connect the wireless radio frequency transmitter to the LINE OUT terminals. Place the active speakers at your preferred location. Be sure to follow the instructions supplied with the active speakers.

Note
- *Availability of a wireless transmitter and its peripherals is subjected to the approval of local authorities. Please check with your local safety or approving authority.*

Ⓕ Digital Out Connection

You can record the digital sound from the CD, through this output, on any audio equipment with digital input (e.g. CD Recorder, Digital Audio Tape (DAT) deck, Digital to Analog Converter and Digital Signal Processor).

Connect one end of the cinch cable (not supplied) to the DIGITAL OUT socket and the other end to the audio equipment with digital input. When connecting the cinch cable, make sure it is fully inserted.

Ⓖ Connecting other equipment to your system

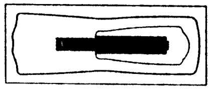
You can connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD-Recorder to the AUX/CDR IN terminals at the rear of the system.

Ⓗ AC Power Supply

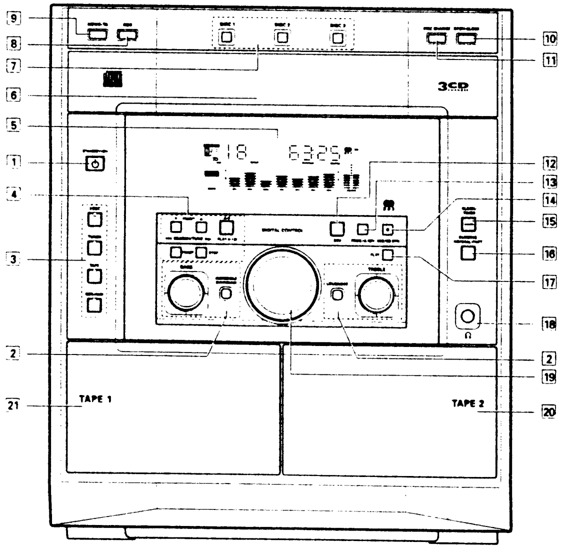
After all other connections have been made, connect the AC power cord to the system and to the wall outlet.

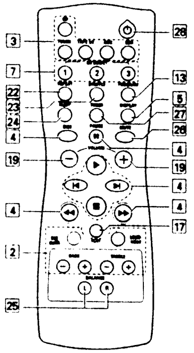
Inserting batteries into the Remote Control

- Insert the batteries (Type R06 or AA) into the remote control as shown in the battery compartment.



- To avoid damage from possible battery leakage, remove dead batteries or batteries that will not be used for a long time. For replacement, use type R06 or AA batteries.





Controls on the system and remote control

1 **STANDBY•ON**
- to switch the system on or to standby mode.
- to use for EASY SET

2 **DIGITAL CONTROL** – to select the desired digital sound effect :

INCREDIBLE SURROUND
- to switch on or off the surround sound effect.

BASS + / –
- to adjust the Bass level.

TREBLE + / –
- to adjust the Treble level.

LOUDNESS
- to switch on or off the loudness sound effect in low volume level.

3 **SOURCE** – to select the following:

3 CDC
- to select CD mode. When CD playback is stopped, press to select the disc tray 1, 2 or 3.

TUNER
- to select Tuner mode. When in Tuner mode, press to select the waveband: FM, MW or LW.

TAPE
- to select Tape mode. When tape playback is stopped, press to select either tape deck 1 or 2.

CDR / AUX
- to select sound from an external source (e.g. TV, VCR, Laser Disc player, DVD player or CD Recorder). When in Aux mode, press to select either AUX/DVD or CDRW.

4 **MODE SELECTION**

SEARCH / TUNE ◀◀ ▶▶
(PRESET ▼▲)

for CD .... to search backward/ forward
.... to skip to the beginning of the current, previous, or next track *(press the button for less than 0.5 seconds).*
for TUNER .... *(if PRESET mode is OFF)* to tune to a lower or higher radio frequency
.... *(if PRESET mode is ON)* to select a preset station in memory
for TAPE ...... to rewind or fast forward a tape

PLAY ▶ / II (A•B)

for CD .... to start or interrupt playback.
for TAPE .... to start playback
.... SIDE : when playing in Tape 2 mode, to change side

PRESET
to switch on or off the PRESET mode.

STOP ■

for CD .... to stop CD playback or to clear a program
for TUNER ..... to stop programming
for TAPE .... to stop playback or recording
DEMO .... *(on the system only!)* to start or stop demonstration mode

5 **DISPLAY SCREEN**
- to view the current setting of the system

6 **CD CAROUSEL TRAY**

7 **DISC 1 / DISC 2 / DISC 3**
- to select a CD tray for playback

8 **RDS**
- to select RDS data in the following order: station name, program type, radio text and frequency

9 **NEWS•TA**
- to hear News or Traffic Announcement data automatically

10 **OPEN•CLOSE**
- to open or close the CD carousel

11 **DISC CHANGE**
- to change CD(s)

12 **DIM**
- to select 4 different DIM mode on the display screen, DIM 1, DIM 2, DIM 3 or DIM OFF
- to reset the tape counter in tape mode only *(press the button for more than 2 seconds)*

13 **PROG / A. REV (PROGRAM / AUTO REVERSE)**

for CD .... to program CD tracks
for TUNER ..... to program preset radio stations
for TAPE .... to select the desired play modes (⊐ / ⊐⊃ / (⊐)) on tape deck 2 only

14 **REC / CD SYN (RECORD / CD SYNCHRO)**
- to start recording or to synchronise the CD recording on tape deck 2

15 **CLOCK/TIMER**
- to view the clock, set the clock or set the timer

16 **DUBBING NORMAL•FAST**
- to dub a tape in normal or fast speed

17 **FLAT**
- to switch on or off the digital sound control setting

18 **Ω**
- to connect headphones

19 **VOLUME**
- to adjust the volume

20 **TAPE DECK 2**

21 **TAPE DECK 1**

22 **REPEAT**
- to repeat a CD track, a disc, or all the available discs

23 **SHUFFLE**
- to play all the available discs and their tracks in random order

24 **SLEEP**
- to switch the system to standby mode at a selected time period.

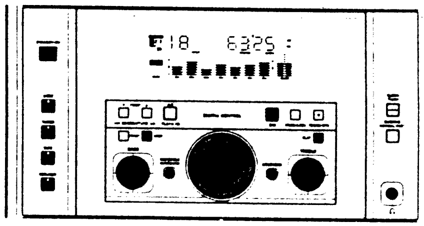
25 **BALANCE L/R**
- to balance the sound level of the Front Left and Right speakers.

26 **MUTE**
- to switch off the sound temporarily.

27 **TIMER**
- to switch on or off timer.

28 **⏻**
- to switch the system to standby mode

Notes for remote control:
- ***First select the source you wish to control by pressing one of the source select keys on the remote control (e.g. CD, TUNER, TAPE 1/2 or AUX).***
- ***Then select the desired function (▶, ⏮, ⏭, etc.).***



Important:
Before you operate the system, complete the preparation procedures.

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system. ***When the system is switched on for the first time, the demonstration mode will start automatically.***

Notes:
- *During the demonstration, if you press any source (or standby-on) button, the system will switch to the respective mode (or standby).*
- *When the system is switched to standby mode, the demonstration will resume 5 seconds later.*

To stop the demonstration mode
- Press and hold **STOP** *(on the system only!)* for **5 seconds** when the system is in demonstration mode.
  - → The demonstration will stop.
  - → "DEMO OFF" is displayed.
  - → The system will switch to standby mode.

Note:
- *Even though the AC power cord is removed from and reconnected to the wall socket, the demonstration will remain off until it is switched on again.*

To start the demonstration mode
- Press and hold **STOP** *(on the system only!)* for **5 seconds** when the system is in standby mode.
  - → The demonstration will begin.

Easy Set

EASY SET allows you to store all available radio stations and RDS stations automatically

1. Press and hold **STANDBY•ON** *(on the system only)* for ***5 seconds*** when the system is in standby or demonstration mode
   → "EASY SET" will be displayed, and followed by "TUNER" and then "AUTO"
   → EASY SET will start searching for all radio stations with RDS and then followed by radio stations on FM, MW and LW band respectively
   → All available RDS and radio stations with sufficient signal strength will be stored. Up to 40 presets may be stored
2. The system will proceed to set the RDS time automatically with the stored RDS preset station

- If no RDS station is available in the first preset station, the program will exit automatically
  → After a radio station is found, "EASY SET" will be displayed and followed by "TIME"
- When searching RDS time,
  → "SEARCH RDS TIME" will be displayed.
  → When RDS time is read, "RDS TIME" will be displayed. The current time will be displayed for 2 seconds and stored automatically

Notes:
- *EASY SET will start with the RDS station, if there are still presets available, it will continue to store the FM, MW and LW bands respectively.*
- *When EASY SET is used, all previously stored radio stations will be replaced*
- *The last preset radio station or the first available RDS station will appear on the display when EASY SET is completed.*
- *If RDS station does not transmit RDS time within 90 seconds, the program will exit automatically and the display will show "NO RDS TIME".*

Switching the system ON

- Press **STANDBY•ON** *(on the system only)*, **3 CDC**, **TUNER**, **TAPE** or **CDR/AUX**

You can also switch on the system by pressing any one of the CD DIRECT PLAY buttons

Switching the system to standby mode

- Press **STANDBY•ON** again or ⏻ on the remote control.
  → The system will switch to standby mode

Selecting the Source

- Press the respective source selection button: **3 CDC**, **TUNER**, **TAPE** or **CDR/AUX**.
  → The display indicates the selected source

Note:
- *For an external source, make sure you have connected the audio left and right OUT terminals of the external equipment (TV, VCR, Laser Disc player, DVD player or CD Recorder) to the AUX/CDR IN terminals.*

Dim Mode

This feature allows you to select 4 different modes for display brightness.

- Press **DIM** to select the desired screen display brightness: DIM 1, DIM 2, DIM 3 or DIM OFF.
  → The DIM display lights up.
  → "DIM 1", "DIM 2", "DIM 3" or "DIM OFF" will be displayed depending on the mode selected.

Volume Adjustment

Adjust VOLUME to increase or decrease the sound level.

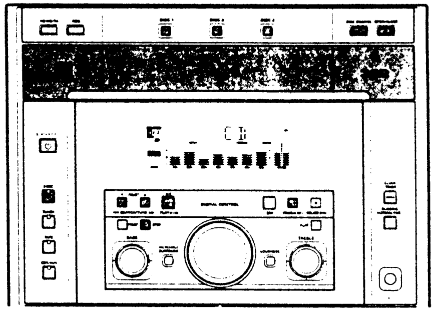
For Personal Listening
Connect the headphones plug to the 🎧 socket at the front of the system. The speakers will be muted.

MUTE *(on remote control only)*
This feature allows you to temporarily switch off the sound without switching off the system when you require a moment of silence.

- Press **MUTE** on the remote control to switch off the sound.
  → "MUTE" will be displayed.
- Press **MUTE** again on the remote control or increase the VOLUME level to switch on the sound.

BALANCE L/R *(on remote control only)*
You can adjust the sound balance of the left and right speakers.

- Press **BALANCE L/R** on the remote control to adjust the sound of the front Left or Right speaker respectively.
  → The display will show "LEFT X", "BALANCED" or "RIGHT X".



Warning!
1. ***This system is designed for conventional CDs. Do not use any accessories such as disc stabilizer rings or CD treatment sheets, etc., which may damage the CD mechanism.***
2. ***Do not load more than one disc into each tray.***
3. ***When the CD changer is loaded with CDs, do not turn over or shake the system. This may jam the changer.***

You may load three discs in the CD changer for continuous playback without interruption.

Disc for playback

This system can playback all audio CD, finalized audio CD-Recordable and finalized audio CD-Rewritable format discs.

COMPACT disc DIGITAL AUDIO   COMPACT disc DIGITAL AUDIO   COMPACT disc DIGITAL AUDIO ReWritable

Loading the CD Changer

1. Press **3 CDC** to select CD mode
2. Press **OPEN•CLOSE**.
   → The CD carousel slides out
3. Load a CD with the printed side up in the right tray

- You can load another disc in the left tray
- To load the third disc, press the **DISC CHANGE** button
  → The CD carousel will rotate until the empty tray is ready for loading

4. Press **OPEN•CLOSE** to close the CD carousel.
   → The total number of tracks and the playing time of the last selected disc appear on the display

Note:
- *To ensure good system performance, wait until the CD changer completely reads the disc(s) before proceeding*

CD Direct Play

You can play a CD directly by pressing the **DISC 1**, **DISC 2** or **DISC 3** button. The CD player will stop at the end of playback of the selected disc.

- A lit button indicates that a disc is loaded in the disc tray

Playing a CD

1. Press **PLAY ▶** to start playback
   → The disc tray, track number and elapsed playing time of the current track appear on the display

- To interrupt playback, press **II**
  → The playing time flashes
- To resume playback, press **PLAY ▶** again

2. To stop playback, press **STOP**.

Note:
- *All the available discs will play once, then stop*

Disc Change

You can change the outer two discs while the third inner disc is stopped or is playing

1. Press **DISC CHANGE**
   → The CD carousel slides out
2. Replace the discs in the left and right disc trays

- If you press **DISC CHANGE** again during playback, the CD will stop playing
  → The CD carousel will rotate until the inner tray is rotated out and is ready for loading

3. Press **OPEN•CLOSE** to close the CD compartment

Digital Control

The Digital Control feature enables you to adjust the system to suit your type of music

INCREDIBLE SURROUND
Normal stereo sound is determined by the distance between the front speakers. When Incredible Surround is switched on, it magnifies the virtual distance between the front speakers for an incredibly wide, enveloping stereo effect.

- Press **INCREDIBLE SURROUND** to switch on
  → The INCREDIBLE SURROUND display lights up
  → "INCREDIBLE SURROUND ON" will be displayed.

To switch off Incredible Surround
- Press **INCREDIBLE SURROUND** again
  → The INCREDIBLE SURROUND display is switched off
  → "INCREDIBLE SURROUND OFF" will be displayed.

BASS/TREBLE
There are 7 different BASS/TREBLE levels available for selection.

- **Rotate the BASS** or **TREBLE** to select the desired bass or treble level respectively.
  → The BASS/TREBLE level will increase or decrease between level +3 and −3
  → If BASS is selected, the display will show either "BASS +X or -X".
  → If TREBLE is selected, the display will show either "TREBLE +X or -X".

Note:
- *"X" denotes the sound level.*

LOUDNESS
Special sound effect that provides some kind of bass, treble accentuation effect specially for low volume level. It can be switched on additionally to all sound settings

- Press **LOUDNESS** to switch on.
  → The LOUDNESS display lights up
  → "LOUDNESS ON" will be displayed

To switch off Loudness sound effect
- Press **LOUDNESS** again.
  → The LOUDNESS display is switched off.
  → "LOUDNESS OFF" will be displayed

Flat

This feature allows you to temporarily switch off all the DIGITAL CONTROL setting (e.g. Bass, Treble, Incredible Surround, etc.)

- Press **FLAT** to switch off the digital control setting.
  → The FLAT display lights up.
  → "FLAT ON" will be displayed.
- Press **FLAT** again to restore the previous setting.
  → The FLAT display is switched off.
  → "FLAT OFF" will be displayed.

Selecting a desired track

Selecting a desired track when playback is stopped
1. Press ⏮ or ⏭ *(or ⏮ / ⏭ on the remote control)* until the desired track appears on the display.
2. Press **PLAY ▶** to start playback.
   → The selected track number and elapsed playing time appear on the display.

Selecting a desired track during playback
- Press ⏮ or ⏭ *(less than 0.5 seconds)* until the desired track appears on the display.
  → The selected track number and elapsed playing time appear on the display.
- If you press ⏮ once it will skip to the beginning of the current track and play the track again.

Searching for a particular passage during playback

- Press and hold **SEARCH** ⏮ or ⏭ *(or ◀◀ / ▶▶ on the remote control)* until the desired passage is located.
  → The volume will be reduced.
- Play returns to normal when **SEARCH** ⏮ or ⏭ is released.

Programming Tracks

Programming tracks of a loaded CD is possible when playback is stopped. The display will indicate the total tracks stored in the program. Up to 40 tracks can be stored in the memory in any order. When 40 tracks are stored and you attempt to store another track, the display will show "FULL".

1. Load the desired discs in the disc trays.
2. Press **PROGRAM** to start programming.
   → The PROGRAM flag starts flashing.
   → It will cancel any previously selected repeat mode.
3. Press the **3 CDC** button to select the disc.
4. Press ⏮ or ⏭ *(or ⏮ / ⏭ on the remote control)* to select the desired track.
5. Press **PROGRAM** to store the track.

- Repeat steps ***3*** to ***5*** to store other discs and tracks.

6. Press **STOP** once to end programming.
   → The total number of tracks programmed and total playing time appear on the display.

Notes:
- *If the total playing time is more than "99:59" or if one of the programmed tracks has a number greater than 30, then "- - : - -" appears on the display instead of the total playing time*
- *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Reviewing the program

Reviewing of the program is possible only when playback is stopped.

- Press ⏮ or ⏭ repeatedly to review the programmed tracks
- Press **STOP** to exit review mode

Playing the program

1. Press **PLAY ▶** to start program playback.
   → "PLAY PROGRAM" appears on the display.
   → The track number and elapsed playing time of the current track will appear on the display.

- If you press **REPEAT** during program playback, the current track or all programmed tracks will be played repeatedly.
  → "TRACK" or "PROGRAM" will be displayed.
  → The REPEAT and PROGRAM flags will be displayed

2. Press **STOP** to stop program playback

Notes:
- *If you press any of the CD DIRECT PLAY buttons, the system will play the selected disc or track and the stored program will be ignored temporarily. The PROGRAM flag also will disappear temporarily from the display. It will reappear when playback of the selected disc ends*
- *REPEAT DISC mode will be cancelled when program playback begins*

Erasing the program *(when playback is stopped)*

- Press **STOP**
  → "PROGRAM CLEARED" will be displayed.

Note:
- *The program will be erased when the system is disconnected from the power supply or when the CD carousel is opened. If the CD carousel is opened, the tracks belonging to the outer two trays will be erased and the display will show "TRACKS CLEARED".*

Shuffle *(only on remote control)*

In shuffle mode, the system plays all the available discs and their tracks in random order. Shuffle may be used also when tracks are programmed.

To shuffle all the discs and tracks

1 Press **SHUFFLE**
   - → "SHUFFLE" will be displayed
   - → The SHUFFLE flag, the disc and the track selected at random appear on the display
- The discs and the tracks will be played in random order until you press **STOP**.
- If you press **REPEAT** during shuffling, the current track or all available discs will be played repeatedly
   - → "TRACK" or "ALL" will be displayed
   - → The REPEAT and SHUFFLE flags will be displayed

2 Press **SHUFFLE** again to resume normal playback
   - → The SHUFFLE flag disappears from the display.

Note
- *REPEAT DISC mode will be cancelled when shuffle is selected*

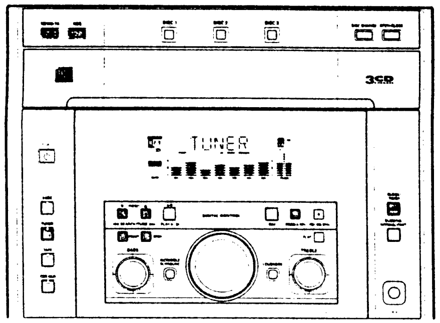
Repeat *(only on remote control)*

You can play the current track, a disc or all available discs repeatedly.

1 Press **REPEAT** on the remote control to select the various repeat modes
   - → "TRACK", "DISC", "ALL" or "OFF" will be displayed
   - → The REPEAT flag appears on the display
- The selected track, selected disc or all available discs will now be played repeatedly until you press **STOP**

2 Press **REPEAT** until the "OFF" mode is displayed to resume normal playback
   - → The REPEAT flag disappears from the display

Notes.
- *REPEAT DISC mode is not available during program play or shuffling mode*
- *You can also repeat shuffling a program.*
   - *→ "REPEAT TRACK" or "REPEAT PROGRAM" will be displayed*
   - *→ The REPEAT, PROGRAM and SHUFFLE flags appear on the display.*



Note:
- *For 'EASY SET' feature, please refer to page 11*

Tuning to radio stations

1 Press **TUNER** to select TUNER mode.
   - → "TUNER" will be displayed.
   A few seconds later, the current radio frequency will be displayed.

2 Press **TUNER** again to select the desired waveband : FM, MW or LW.

3 Press **TUNE** ⏮ or ⏭ *(or ◀◀/▶▶ on the remote control)* for more than one second, then release.
   - → The display will show "SEARCH" until a radio station with sufficient signal strength is found.
- Repeat this procedure until the desired station is reached.
- To tune to a weak radio station, briefly press **TUNE** ⏮ or ⏭ repeatedly until the display shows the desired frequency and/or when the best reception has been obtained.

Note:
- *Before activate TUNING function on the system, make sure that the PRESET mode is switched off .*

Storing Preset Stations

You can store up to 40 radio stations in the memory. When a preset radio station is selected, the preset number appears next to the frequency on the display.

Automatic programming

1 Press **TUNER**

2 Press **PROGRAM** for more than one second
   - → The PROGRAM flag starts flashing and "AUTO" will be displayed.
   - → The system will search for every available station in the FM waveband first, then search by the MW and LW wavebands
   - → All available radio stations will be stored automatically. The frequency and preset number will be displayed briefly.
   - → The system will stop searching when all the available radio stations are stored or when the memory for 40 preset radio stations is used
   - → The system will remain tuned to the last stored preset radio station

Notes
- *You can cancel the automatic programming by pressing PROGRAM or STOP (on the system only)*
- *If you want to reserve a section of preset numbers, for example preset numbers 1 to 9, select preset 10 before starting automatic programming only the preset numbers 10 to 40 will be programmed*

Manual programming

1 Press **TUNER**.

2 Press **TUNER** again to select the desired waveband : FM, MW or LW.

3 Press **PROGRAM** for less than one second
   - → The PROGRAM flag starts flashing
   - → The next available preset number will be displayed for selection.

4 Press **TUNE** ⏮ or ⏭ *(or ◀◀/▶▶ on the remote control)* to tune to the desired frequency
- If you wish to store the radio station to another preset number, first select PRESET mode, then press **PRESET** ▼ or ▲ to select the desired preset number.
   - → The PRESET flag will be displayed

5 Press **PROGRAM** again
   - → The PROGRAM flag disappears and the radio station will be stored

- Repeat the ***steps 3 to 5*** to store other preset radio stations

Notes
- *When 40 radio stations are stored and you attempt to store another radio station, the display will show " FULL ". If you want to change an existing preset number, repeat steps 3 – 5.*
- *You can cancel manual programming by pressing STOP (on the system only).*
- *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*
- *When in programming mode, the PRESET mode will automatically be activated.*

Tuning to Preset Radio Stations

1 Press **PRESET** to switch on the PRESET mode.
   - → The PRESET flag will be displayed.

2 Press **PRESET** ▼ or ▲ *(or ⏮ / ⏭ on the remote control)* to select the desired preset number.
   - → The preset number, radio frequency, and waveband appear on the display.

Receiving RDS Radio Station

RDS (Radio Data System) is a broadcasting service that allows FM stations to send additional information along with the regular FM radio signal. This additional information can contain:

- **STATION NAME:** The radio station name is displayed.
- **PROGRAM TYPE:** The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
- **RADIO TEXT (RT):** text messages appear in the display.

When you have tuned to a RDS station, the RDS logo (and the radio station name will appear on the display:

- The display normally shows the radio station name if available
  By repeatedly pressing **RDS** button you can change the type of display information:
   - → The display shows in turn:
     STATION NAME → PROGRAM TYPE → RADIO TEXT → TUNED FREQUENCY → STATION NAME ...

Note:
- *When you press the RDS button and the display shows "NO RDS", it indicates that either the tuned station is not transmitting RDS signal or it is a non RDS station.*

RDS Clock

Some RDS station may be transmitting a real clock time at an interval of every minute.

Setting the time with RDS clock

1 Press **CLOCK/TIMER**
   - → "- - : - -" or current time appears on the display

2 Press **CLOCK/TIMER** once more to enter clock setting mode.
   - → "00:00" or current time starts flashing.

3 Press **RDS**.
   - → The message "SEARCH RDS TIME" will be displayed.
   - → If the station does not transmit RDS clock, "NO RDS TIME" will be displayed.
   - → When the RDS clock is read, "RDS TIME" will be displayed. The current clock time is displayed for 2 seconds and will be stored automatically.
   - → If within 90 seconds, the RDS time is not detected, "NO RDS TIME" will be displayed.

NEWS•TA (Traffic Announcement) *(only available in Radio Station with RDS)*

You can activate NEWS or TA function in Standby, Demonstration or any source mode except Tuner mode. Once the News Program Type (for NEWS function) or Traffic Announcement data (for TA function) is detected in any of the selected RDS stations, it will switch to TUNER mode automatically.

NEWS•TA key toggles in the following sequence

NEWS → TA → OFF → NEWS

To start NEWS or TA function

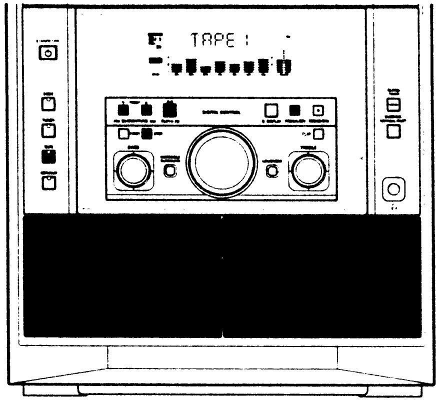
1 Press **NEWS•TA** to select NEWS function.
   - → The NEWS flag and "NEWS" will be displayed.
- If you want to select TA function, press **NEWS•TA** again.
   - → The TA flag and "TA" will be displayed.

2 When NEWS or TA is selected.
- It will scan RDS stations stored in the first 5 preset and wait for the News Program Type / Traffic Announcement data to be available in any of these RDS stations. During the search :
   - → The current source activity will remain uninterrupted.
   - → If no RDS station is found in the first 5 presets, the NEWS•TA function will be switched off. The display will show "NO RDS NEWS" or "NO RDS TA" and NEWS or TA flag will disappear from the display
- When NEWS•TA transmission is detected, the system will switch to Tuner mode.
   - → The NEWS or TA flag starts flashing

To cancel NEWS or TA function

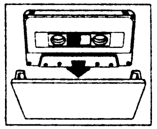
- Press **NEWS•TA** until the NEWS or TA flag disappears and "TA OFF" is displayed

Notes:
- *If you are listening to a non RDS TUNER radio station and should you decide to hear NEWS or TA, first select other source (e.g. 3CDC, TAPE or CDR/AUX), then press NEWS•TA*
- *Before using the NEWS or TA feature, ensure that the first 5 presets are RDS stations.*
- *The NEWS•TA works only once for each activation.*
- *During News bulletin or Traffic Announcement, you can press any available source or Tuner function keys to cancel NEWS•TA function and execute the relevant source mode.*
- *If set is switched to Tuner source, the NEWS•TA function will be cancelled. "NEWS OFF" or "TA OFF" will be displayed immediately after the "TUNER" message.*



Loading a tape

- Press on the tape deck to open the tape deck door.
- Load the tape with the open side downward and the full spool to the left
- Close the tape deck door.



Tape Playback

1 Press **TAPE** to select TAPE mode
   - → "TAPE 1" or "TAPE 2" will be displayed.
- Press **TAPE** again to select either tape deck 1 or tape deck 2

2 Load the tape into the desired tape deck.

3 Press **PLAY** ▶ to start playback.

3a (For Tape Deck 2 only)
Press **A•B** (SIDE) to switch playback between side A and B.
   - → The BACK or FRONT flag appears on the display, depending on the side selected.

3b (For Tape Deck 2 only)
Press **A. REV** to select the different type of playback mode *(see auto reverse playback)*.

4 Press **STOP** to end playback.

Note:
- *To change side before playback begins, use the SIDE button on the remote control.*

Auto Reverse Playback *(only on tape deck 2)*

- Press **A. REV** to select the different playback modes

⇌ .	to record or playback on one side of the tape. The tape stops at the end of one side
⊃	to record or playback on both sides of the tape. The tape then stops
⊂⊃ ...	to playback continuously on both sides of the tape up to a maximum of 10 times per side unless you press **STOP**

Rewind/Fast Forward

When playback is stopped

1 You can rewind or fast forward the tape by pressing ⏮ or ⏭ *(or ◀◀/▶▶ on the remote control)* respectively
   - → "TAPE 1 XXX" or "TAPE 2 XXX" will be displayed depending on which button is pressed.
   - → The tape will stop automatically at the end of the rewinding or fast forwarding

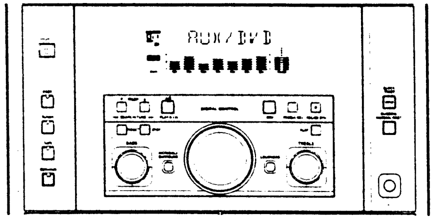
2 Press **STOP** to stop rewinding or fast forwarding

During playback

- Press and hold ⏮ or ⏭ (or ◀◀ / ▶▶ on the remote control) until the desired passage is located
  - → During searching the sound is reduced to a low volume
  - → When you release ⏮ or ⏭ the tape continues playing

Notes

- *"[illegible]" denotes the tape counter number. It will automatically set to zero after detecting end of tape or changing tape play direction on TAPE 2. To reset the tape counter number to zero during playback, press the DIM button for more than 2 seconds.*
- *During rewinding or fast forwarding of a tape, it is also possible to select another source (e.g. 3 CDC, TUNER or CDR/AUX).*
- *Before use, check and tighten slack tape with a pencil. Slack tape may get jammed or may burst in the mechanism.*
- *C-120 tape is extremely thin and is easily deformed or damaged. It is not recommended for use in this system.*
- *Store the tapes at room temperature and do not put them too close to a magnetic field (for example, a transformer, TV, or speaker).*



Selecting External Equipment

If you have connected the audio out terminals of the external equipment (TV, VCR, Laser Disc player, DVD player, or CD Recorder) to the AUX/CDR IN terminals, you can hear the enhanced sound from the system.

- Press **CDR/AUX** to select AUX-DVD mode.
  - → "AUX/DVD" will be displayed.
- Press **CDR/AUX** again to select the CDRW mode.
  - → "CDRW" will be displayed.

Notes:

- *There are two external modes:*
  - *i. the normal AUX/DVD mode.*
  - *ii. the CDRW mode; where the LINE OUT of this mini system is muted. You will not be able to record or listen to the sound from the LINE OUT.*
- *You are advised not to listen to and record from the same source simultaneously.*
- *All the sound control features (e.g. Incredible Surround, Bass/Treble, etc.) are available for selection.*

Dubbing tapes *(from tape deck 1 to tape deck 2)*

1 Press **TAPE** to select tape deck 2.
2 Load the prerecorded tape into tape deck 1 and a blank tape into tape deck 2.
- Make sure the tape in tape deck 1 has its full spool to the left.

3 *(For Tape Deck 2 only)*
Press **SIDE** on the remote control to select the recording side.
4 Press **DUBBING NORMAL•FAST** ***once*** for normal speed dubbing or ***twice*** *(within 2 seconds)* for high speed dubbing.
   → "NORMAL" (normal speed) or "FAST" (high speed) will be displayed, followed by "DUBBING".
   → The HSD flag appears on the display during high speed dubbing.
- Dubbing will start immediately.
  - → The REC flag starts flashing.

5 Press **STOP** to stop dubbing.

Notes:

- *At the end of side A, flip the tapes to side B and repeat the procedure.*
- *Dubbing of tapes is only possible from tape deck 1 to tape deck 2.*
- *To ensure good dubbing, use tapes of the same length.*
- *During high speed dubbing in Tape mode, the sound is reduced to a low volume.*
- *You can listen to another source while dubbing.*

CD Synchro Start Recording

During CD synchro start recording,

- Do not fast forward/rewind your tape in tape deck 1.
- Do not listen to another source.

1 Press **TAPE** to select tape deck 2.
- Load a blank tape into tape deck 2 with the open side downward.

2 Press **SIDE** on remote control to select the recording side.
3 Press **A. REV** to select the playback mode (⊐ or ⊐⊃).
4 Press **3 CDC**.
- You can program the tracks in the order you want them to be recorded (see Programming Tracks). If you do not, the tracks are recorded according to the order on the selected disc.

5 Press **CD SYN** to start recording.
   → The REC flag starts flashing.
6 Press **STOP** to stop recording CD playback.

One Touch Recording

- For One Touch Recording, as soon as you press **REC**, the current source (3 CDC, TUNER or CDR/AUX) will be recorded on tape deck 2.

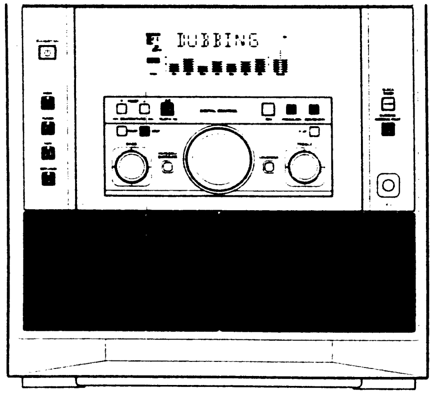
1 Load a blank tape in tape deck 2.
2 Press **REC** to start recording.
   → The REC flag starts flashing.
3 Press **STOP** to stop recording.

Note:

- *When you press RECORD while in TAPE mode, "SELECT SOURCE" will be displayed. One Touch Recording is not possible in TAPE mode.*

Digital Recording via Digital Out

For CD digital recording, please refer to the Instructions Manual of the CD Recorder, digital audio equipment, etc.



Notes:

- *For recording, use only tape of IEC type I (normal tape) or IEC type II (CrO_2).*
- *The tape is secured at both ends with leader tape. At the beginning and end of tape, nothing will be recorded for 6 to 7 seconds.*
- *The recording level is set automatically, regardless of the position of Volume, Incredible Surround or Bass/Treble.*
- *To prevent accidental recording, break out the tab on the left shoulder of the tape side you want to protect.*
- *If "CHECK TAPE" is displayed, the protection tab has been broken. Put a piece of clear adhesive tape over the opening. Do not cover the CrO_2 tape detection hole when covering the tab opening.*

Recording from other sources

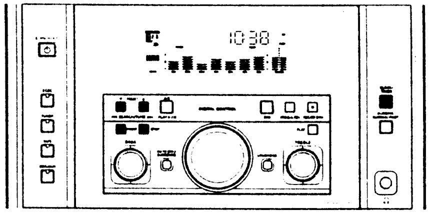
(only on tape deck 2)

1 Press **TAPE** to select tape deck 2.
2 Load a blank tape into tape deck 2 with the open side downward.
3 Press **SIDE** on remote control to select the recording side.
   → The BACK or FRONT flag will be displayed, depending on the side selected.
4 Press **3 CDC**, **TUNER** or **CDR/AUX**.
- Start playback of the selected source.

5 Press **REC** to start recording.
   → The REC flag starts flashing.
6 Press **STOP** to stop recording.

Notes:

- *Only ⊐ or ⊐⊃ mode is available during recording.*
- *During recording, it is not possible to listen to another source.*



Viewing the Clock

You can view the clock (if it is set) while the system is in standby mode or any source mode. It will be displayed for about 7 seconds.

- Press **CLOCK/TIMER** briefly *(on the system only)*.
  - → " 10:38" (the current time) will be displayed.
  - → "--:--" will be displayed if the clock is not set.

Setting the Clock

The clock is set in 24-hour mode, e.g. "00:00" or "23:59". Before setting the clock, you must be in the View Clock mode.

1 Press **CLOCK/TIMER** to select clock mode.
   → "00:00" or the current time starts flashing.
2 Press ⏮ or ⏭ to set the hour *(PRESET mode OFF)*.
3 Press ⏮ or ⏭ to set the minute *(PRESET mode ON)*.
4 Press **CLOCK/TIMER** again to store the setting.
   → The clock starts.

- To exit without storing the setting, press **STOP** on the system.

Notes:

- *During clock setting, if no button is pressed within 90 seconds, the system will exit clock setting mode automatically.*
- *When a power interruption occurs, the clock setting is erased.*
- *To set the time with RDS clock, see "Receiving RDS Radio Station" under TUNER section.*

Setting the Timer

- The system can switch on to CD, TUNER, or TAPE 2 mode automatically at a preset time. It can serve as an alarm to wake you up.
- Before setting the timer, make sure the clock is set correctly.
- The timer will always be switched on once it is set.
- **The volume of the timer will start to increase from the minimum level until the volume level before the set is switched to standby mode.**

1 Press and hold **CLOCK/TIMER** for more than 2 seconds to select timer mode.
   → "00:00" or the last set timer starts flashing. The TIMER flag flashes.
   → The last selected source is lit while other available sources are flashing.
2 Press **3 CDC**, **TUNER** or **TAPE** to select the desired source.
- Before selecting CD or TAPE, make sure a CD or tape is loaded in the CD tray or tape deck 2.

3 Press ⏮ or ⏭ to set the hour for the timer to start *(PRESET mode OFF)*.
4 Press ⏮ or ⏭ to set the minute for the timer to start *(PRESET mode ON)*.
5 Press **CLOCK/TIMER** to store the start time.
   → The timer is now set.
   → The TIMER flag remains on the display.

- At the preset time, the timer will be activated
  - → The selected source will be played

Notes

- *During timer setting, if no button is pressed within 90 seconds, the system will exit timer setting mode automatically.*
- *If the source selected is TUNER, the last tuned frequency will be switched on.*
- *If the source selected is CD, playback will begin with the first track of the last selected disc. If the CD trays are empty, the TUNER will be selected instead.*
- *If the source selected is TAPE, and if the preset time is reached during high speed dubbing, the TUNER will be selected instead.*
- *If the recording is active, the timer will be cancelled.*

To switch off the TIMER

1 Press **CLOCK/TIMER** for more than 2 seconds *(or **TIMER** on the remote control)*

2 Press **STOP** on the system to cancel the timer
  - → The timer is now switched off
  - → The display will show "OFF" and the TIMER flag disappears

To start the TIMER again *(for the same preset time and source)*

1 Press **CLOCK/TIMER** for more than 2 seconds *(or **TIMER** on the remote control)*

2 Press **CLOCK/TIMER** again to store the start time
  - → The timer is now switched on
  - → The TIMER flag appears on the display

Sleep *(only on remote control)*

This feature allows you to select a length of time after which the system will switch to the standby mode automatically.

- Press **SLEEP** on the remote control repeatedly to select a period of time.
  - → The selections are as follows (time in minutes):
    60 → 45 → 30 → 15 → OFF → 60 .
  - → "SLEEP XX" or "OFF" will be displayed. "XX" is the time in minutes.
- When you reach the desired length of time, stop pressing the **SLEEP** button.
  - → After this amount of time passes, the system will switch to the standby mode.

To switch off the sleep timer

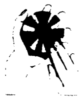
- Press **SLEEP** repeatedly until "OFF" is displayed, or press the **STANDBY•ON** button.

Maintenance

Cleaning the Cabinet

- Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

Cleaning Discs



- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.
- Do not use solvents such as benzine, thinner, commercially available cleaners or antistatic spray intended for analog records.

Cleaning the CD lens

- After prolonged use, dirt or dust may accumulate at the CD lens. To ensure good playback quality, clean the CD lens with Philips CD Lens Cleaner or any commercially available cleaner. Follow the instructions supplied with cleaner.

Cleaning the Heads and the Tape Paths

- To ensure good recording and playback quality, clean the heads, the capstan(s) and pressure roller(s) after every 50 hours of tape operation.
- Use a cotton swab slightly moistened with cleaning fluid or alcohol.
- You can also clean the heads by playing a cleaning tape once.

Demagnetizing the heads

- Use a demagnetizing tape available at your dealer.

Warning! Under no circumstances you should try to repair the set yourself as this will invalidate the guarantee. Do not open the set as there is a risk of electric shock.

- If a fault occurs, check the points listed below before taking the system for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

CD Player Operation

"NO DISC" **is displayed.**

- The disc is inserted upside down.
- → *Place CD with printed side up.*
- Moisture condensation at the lens.
- → *Wait until lens has adjusted to normal room temperature.*
- There is no disc in the CD tray.
- → *Insert a CD.*
- The CD is dirty, badly scratched or warped.
- → *Clean or replace the CD.*
- The CD lens is dirty or dusty.
- → *See section under Maintenance.*

"DISC NOT FINALIZED" **is displayed.**

- The CD-RW or CD-R disc is not properly recorded for the use of a standard CD player.
- → *Read the instruction booklet of your CD-Rewritable or CD-Recorder on how to finalize a recording.*
- The CD is badly scratched or dirty.
- → *Replace or clean CD.*

Radio Reception

Poor radio reception.

- The signal is too weak.
- → *Adjust the antenna.*
- → *Connect an external antenna for better reception.*
- The TV or VCR is too close to the stereo system.
- → *Separate the stereo system from the TV or VCR.*

"NO RDS TEXT" **is displayed.**

- RDS text message is not available.
- → *Select another RDS station.*

Tape Deck Operation

"RECORDING ACTIVE" **is displayed.**

- A recording is in progress.
- → *Stop the recording or wait until it is finished.*

"CHANGE TO TAPE" **is displayed.**

- Tape dubbing is only possible in tape mode.
- → *Switch to tape mode by pressing TAPE.*

Recording or playback cannot be made or there is a decrease in audio level.

- Dirty tape heads, capstans or pressure rollers.
- → *See section on tape deck maintenance.*
- Magnetic build-up in the record/playback head.
- → *Use demagnetizing tape.*

General

System does not react when any button is pressed.

- Electrostatic discharge
- → *Press STANDBY•ON to switch the system off. Remove the AC power plug from the wall outlet, then reconnect the power plug and switch on the system again.*

No or poor sound.

- Volume is not turned up.
- → *Adjust VOLUME.*
- The headphones are connected.
- → *Disconnect the headphones.*
- Speakers are not connected or are connected wrongly.
- → *Check that the speakers are connected correctly.*
- → *Make sure the stripped speaker wire is clamped.*

Reversed left and right sound.

- Speakers are connected wrongly.
- → *Check the speaker connections and location.*

Lack of bass sound or apparently imprecise physical location of musical instruments.

- Speakers are connected wrongly.
- → *Check the speaker connection for proper phasing, red/black wires to red/black terminals.*

Remote control has no effect on the system.

- Wrong source is selected.
- → *Select the source (CD, TUNER, etc.) before pressing the function button. (▶, ⏮, ⏭, etc.)*
- The distance to the system is too large.
- → *Reduce the distance.*
- Batteries are inserted incorrectly.
- → *Insert the batteries with their polarities (+/– signs) as indicated.*
- Batteries are exhausted.
- → *Replace the batteries.*

Timer not working.

- Clock is not set.
- → *Set the clock.*
- Timer is not switched on.
- → *Press CLOCK/TIMER to switch on the timer.*
- Recording is in progress.
- → *Stop dubbing/recording.*

Clock setting is erased.

- There was a power failure.
- → *Reset the clock.*

System displays features automatically; buttons flash continuously.

- Demonstration mode is switched on.
- → *Press and hold STOP (on the system only) for 5 seconds to switch off the demonstration.*

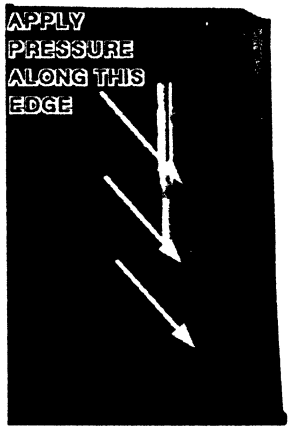
A howling sound at external source.

- You hear feedback when you are listening and recording from the same source simultaneously.
- → *Press CDR/AUX to select CDRW mode.*

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover

Remove Cassette Door

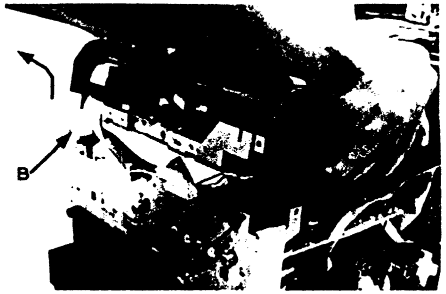


Cassette Door

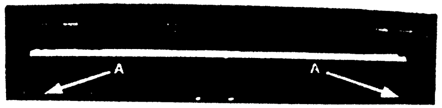
Dismantling of the CDC Module and Front Panel

1) Loosen the 16 screws to remove the Cabinet Rear (pos 259) of the set :-
    - 5 screws each on the left side & right side of the Cabinet Rear.
    - 6 screws at the rear of the Cabinet Rear.
2) Slide out the CDC tray and remove the Cover Tray CDC (pos 112) as indicated.
3) Loosen 2 screws A and 2 screws B to remove the CDC Module (pos 1104) as indicated.
4) Remove 1 screw (pos 305) at the bottom to separate the Front Panel Assembly from the Plate Bottom (pos 231).

Remove Cover Tray CDC



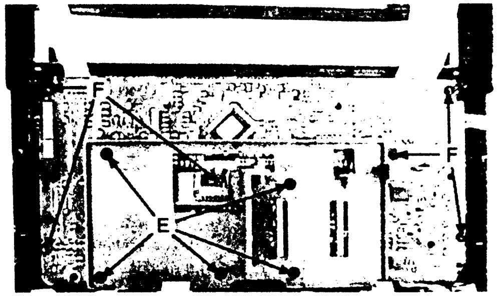
Remove CDC Module



Front CDC

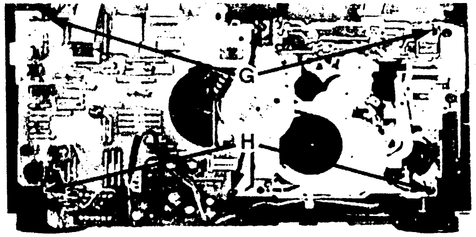
Dismantling of the Front Board

1) Remove 5 screws E as indicated to loosen the Plate Front (pos 254).
2) Remove 6 screws F as indicated to loosen the Front Board (pos 1102-A).



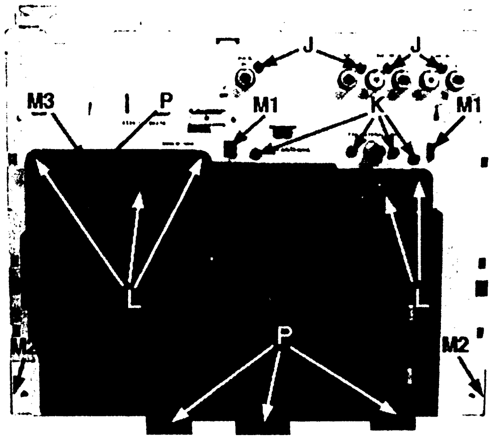
Dismantling of the ETF Module

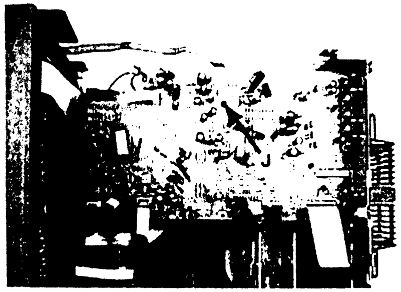
1) Remove 6 screws (3 screws G and 3 screws H) as indicated to loosen the ETF Module (pos 1105).



Dismantling of Rear Portion

1) Remove 5 screws J as indicated to loosen the AF Board (pos 1101).
2) Remove 4 screws K and uncatch M1 as indicated to loosen the Tuner Board (pos 1100).
3) Remove 5 screws L and uncatch M2 as indicated to take out the Plate Rear(pos 229).
4) Remove 4 screws P and uncatch M3 as indicated to free the Power Module (pos 1103) from the Bottom Plate assembly.





AF Board Top View

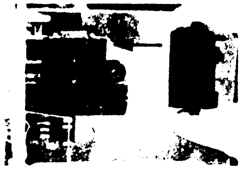
Repair Hints

2) During re-assembly of the Power Module, place the **Bracket Mains Socket** (pos 232) behind the **Mains Socket** and catch it onto the Rucksack (pos 1103-201)of the Power Module. See pictures 1 and 2.

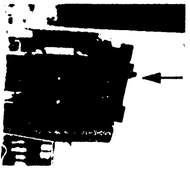
3) During re-assembly of the set, care should be taken to dress all the flex cable wires properly to prevent any damaged cause by any sharp metal edges or any other metal parts. See picture 3.

4) Due to the short flex cable wires in the ETF Module, the pc board should be disconnected and reconnected on the reverse side of the tape mechanism to keep it electrically connected during repair. See picture 4.

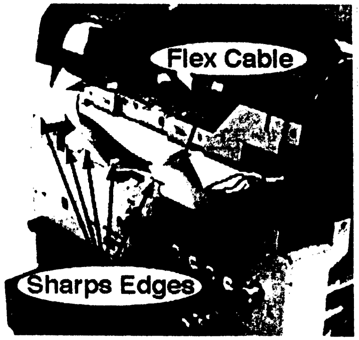
5) During repair it is possible to disconnect the Tuner board and CDC Module completely unless the fault is suspected to be in that area. This will not affect the performance of the rest of the set.



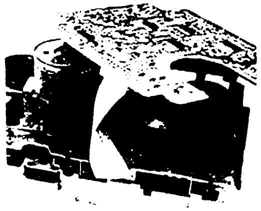
Picture 1



Picture 2

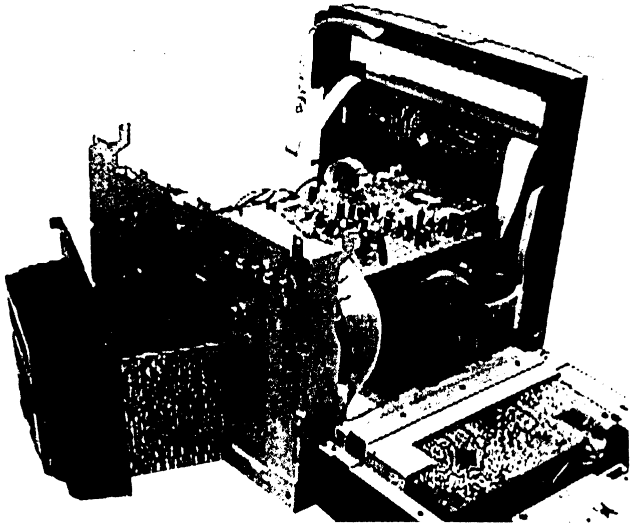


Picture 3

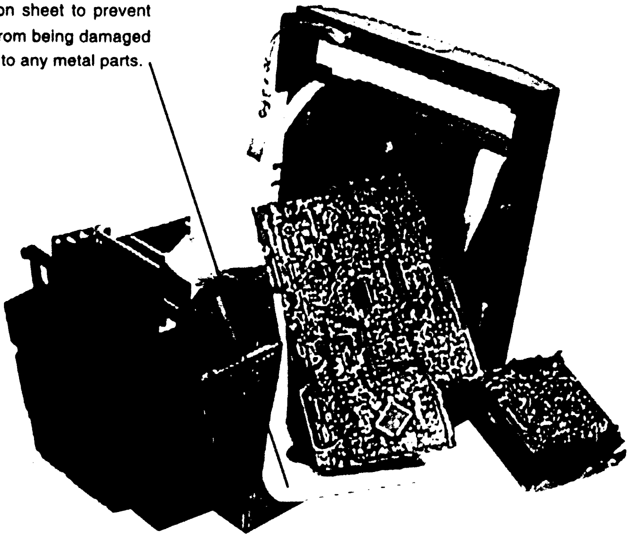


Picture 4

Service pos A

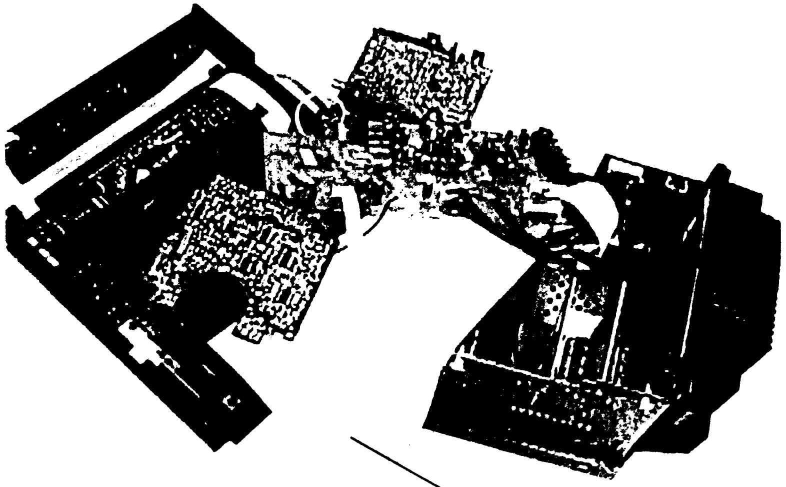


Service pos B



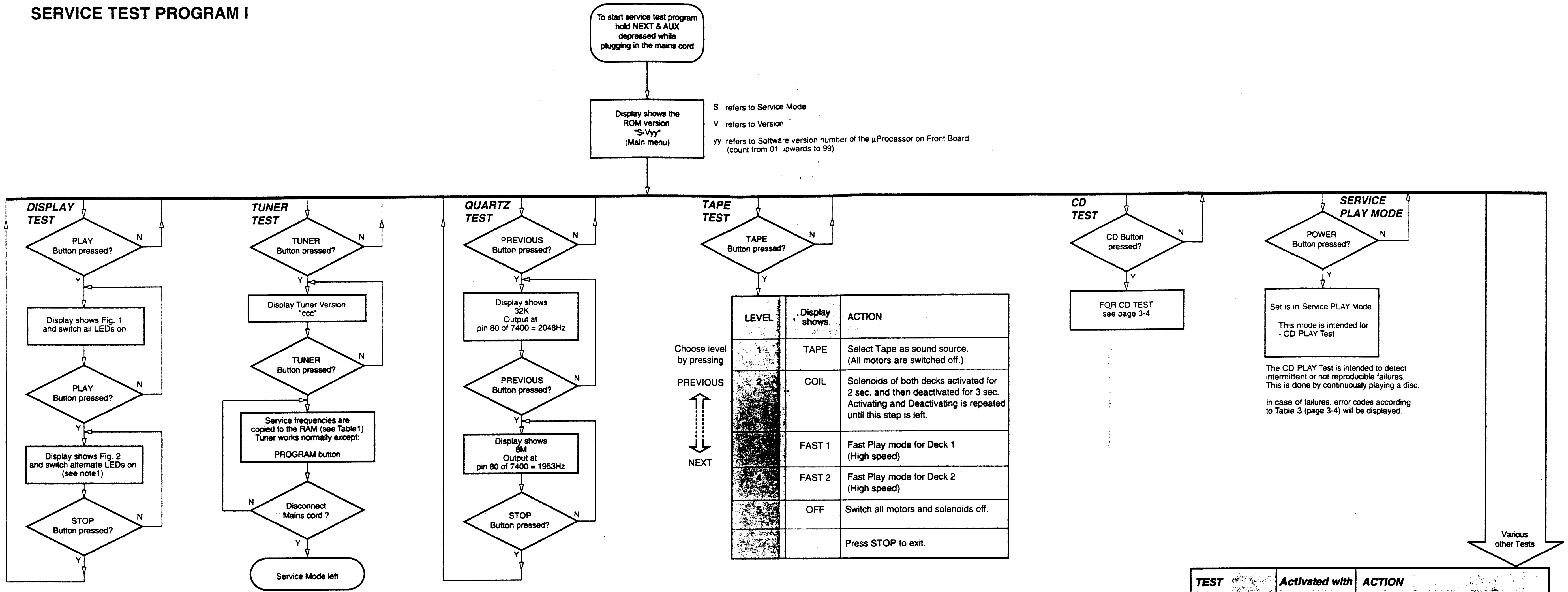
Use a insulation sheet to prevent the AF board from being damaged or short-circuit to any metal parts.

Service pos C



Use a insulation sheet to prevent the ETF and AF board from being damaged or short-circuit to any metal parts.

SERVICE TEST PROGRAM I


To start service test program hold NEXT & AUX depressed while plugging in the mains cord
Display shows the ROM version "S-Vyy" (Main menu)
S refers to Service Mode
V refers to Version
yy refers to Software version number of the µProcessor on Front Board (count from 01 upwards to 99)
DISPLAY TEST
PLAY Button pressed?
N
Y
Display shows Fig. 1 and switch all LEDs on
PLAY Button pressed?
Display shows Fig. 2 and switch alternate LEDs on (see note1)
STOP Button pressed?
TUNER TEST
TUNER Button pressed?
Display Tuner Version "ccc"
TUNER Button pressed?
Service frequencies are copied to the RAM (see Table1) Tuner works normally except: PROGRAM button
Disconnect Mains cord ?
Service Mode left
QUARTZ TEST
PREVIOUS Button pressed?
Display shows 32K Output at pin 80 of 7400 = 2048Hz
PREVIOUS Button pressed?
Display shows 8M Output at pin 80 of 7400 = 1953Hz
STOP Button pressed?
TAPE TEST
TAPE Button pressed?
Choose level by pressing
PREVIOUS
NEXT
CD TEST
CD Button pressed?
FOR CD TEST see page 3-4
SERVICE PLAY MODE
POWER Button pressed?
Set is in Service PLAY Mode.
This mode is intended for
- CD PLAY Test
Various other Tests

LEVEL	Display shows	ACTION
1	TAPE	Select Tape as sound source. (All motors are switched off.)
2	COIL	Solenoids of both decks activated for 2 sec. and then deactivated for 3 sec. Activating and Deactivating is repeated until this step is left.
3	FAST 1	Fast Play mode for Deck 1 (High speed)
4	FAST 2	Fast Play mode for Deck 2 (High speed)
5	OFF	Switch all motors and solenoids off.
		Press STOP to exit.

The CD PLAY Test is intended to detect intermittent or not reproducible failures. This is done by continuously playing a disc.

In case of failures, error codes according to Table 3 (page 3-4) will be displayed.

PRESET	Europe "EUR"	East Europe Extended-band "EAS"	East Europe "EAS"	USA "USA"	Overseas "OSE"
1	87.5MHz	65.81MHz	87.5MHz	87.5MHz	87.5MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz
3	531kHz	74MHz	531kHz	530kHz	531/530kHz
4	1602kHz	87.5MHz	1602kHz	1700kHz	1602/1700kHz
5	558kHz	531kHz	558kHz	560kHz	558/560kHz
6	1494kHz	1602kHz	1494kHz	1500kHz	1494/1500kHz
7	153kHz	558kHz	87.5MHz	98MHz	87.5/98MHz
8	279kHz	1494kHz	87.5MHz	87.5MHz	87.5MHz
9	198kHz	98MHz	87.5MHz	87.5MHz	87.5MHz
10	98MHz	70.01MHz	87.5MHz	87.5MHz	87.5MHz
11	87.5MHz	65.81MHz	98MHz	87.5MHz	98/87.5MHz

Table 1

Keys activated	Display shows	Keys activated	Display shows	Keys activate	Display shows
No Key pressed	--	NEWS / TA *	9	HS DUBBING	19
Any Remote control key	RC	RDS *	10	RECORD	20
DISC CHANGE	1	DOLBY B *	11	PREVIOUS / BACKWARD	21
OPEN / CLOSE	2	LOUDNESS	12	NEXT / FORWARD	22
DISC 1	3	PROG / REVERSE MODE	13	STOP	EXIT
DISC 2	4	CD	14	PLAY / PAUSE	24
DISC 3	5	TUNER	15	DISPLAY	25
POWER / STANDBY	6	TAPE	16	INCREDIBLE SURROUND	26
CLOCK / TIMER	7	AUX	17		
FLAT	8	PRESET / FREQUENCY	18		

* Not for all type/version.

Table 2

TEST	*Activated with*	*ACTION*
EEPROM TEST	FLAT STOP to Exit	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "FAIL" will be displayed.
EEPROM FORMAT TEST	RECORD	Load default data. Display shows "NEW" for 1 second. ***Caution!*** ***All presets from the customer will be lost!!***
KEY TEST	NEXT STOP to Exit	Key numbers according Table 2 are shown on the display.
FAST CLOCK TEST	CLOCK/TIMER	The clock is switched to fast mode. "FAST" is displayed for 1 sec. Press CLOCK/TIMER again to reset the clock to normal. "NORMAL" displayed for 1 sec.
ADC TEST	AUX STOP to Exit	The display shows "ADC1_aa". Press AUX again to shows "ADC2_bb", "ADC3_cc" and "ADC4_dd" where "aa", "bb", "cc" and "dd" is the ADC value between 0 - 65 representing NTC, SA_1, SA_2 and SA_3 lines respectively.
ROTARY ENCODER TEST (For checking of Volume, Bass and Treble controls)	Volume Knob or Bass Knob or Treble Knob	Display shows value for 2 seconds. Value increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

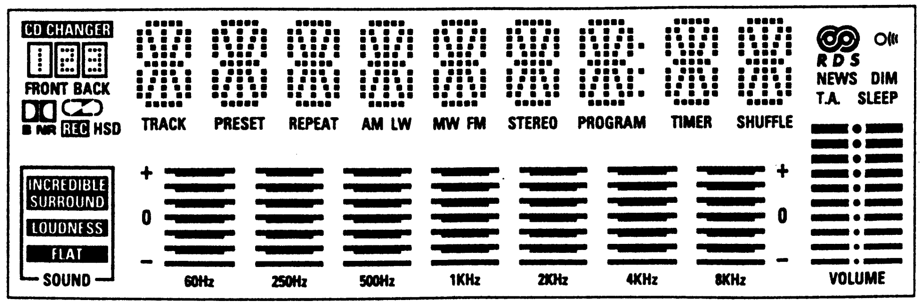
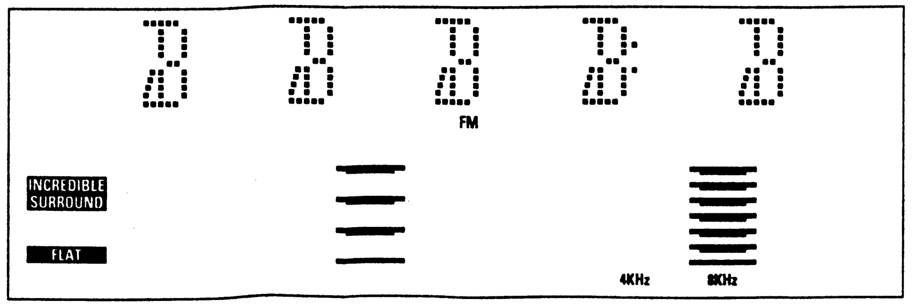

CD CHANGER
FRONT BACK
B NR REC HSD
TRACK
PRESET
REPEAT
AM LW
MW FM
STEREO
PROGRAM
TIMER
SHUFFLE
RDS
NEWS DIM
T.A. SLEEP
INCREDIBLE SURROUND
LOUDNESS
FLAT
SOUND
+
0
-
60Hz
250Hz
500Hz
1KHz
2KHz
4KHz
8KHz
VOLUME

Figure 1


FM
INCREDIBLE SURROUND
FLAT
4KHz
8KHz

note1 : TUNER, AUX, Backlights (dimmed), INCREDIBLE SURROUND, LOUDNESS, CD2.

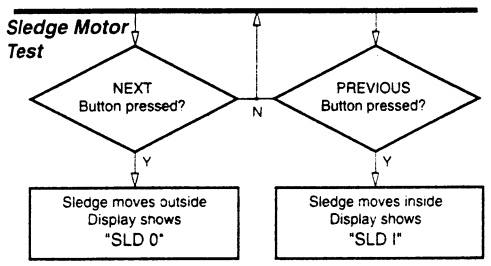
Figure 2

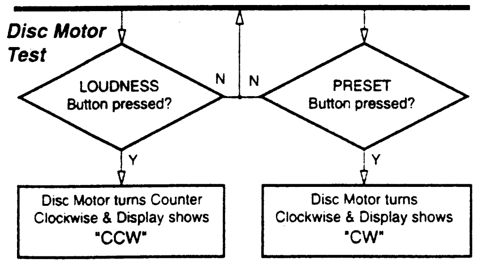
Error code	Type	Error Description
E1000	W	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	W	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	W	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed. Inner-switch or sledge motor problem.
E1003	W	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	W	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
E1006	W	Subcode Error (no subcode within time) Triggered when a new subcode was missing for a certain time during play.
E1007	W	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	W	Turntable Motor Error Generated when the CD could not reached 75‰ of speed during startup within a certain time. Disc motor problem.
E1020	F	Focus Search Error The focus point has not been found within a certain time.
E1070	W	The carousel switch is not open within a certain time. This can happen when either the switch is defective and closed all the time, or when the carousel is blocked when located exactly at a disc position.
E1071	W	The carousel position switch did not close within a certain time. This can happen when the switch is defective and never closes electrically, or when the carousel is blocked in between two disc positions. The time-out is approximately 5 Sec.
E1079	W	The drawer could not enter the inside position is opening again. This can be caused because the drawer is blocked by something and cannot go fully inside, or the drawer switch is defective and does not close.
E2020*	F	Head Movement Error Deck 1 Generated if the head does not reach the desired position within a certain time.
E2021*	F	Head Movement Error Deck 2 Generated if the head does not reach the desired position within a certain time.

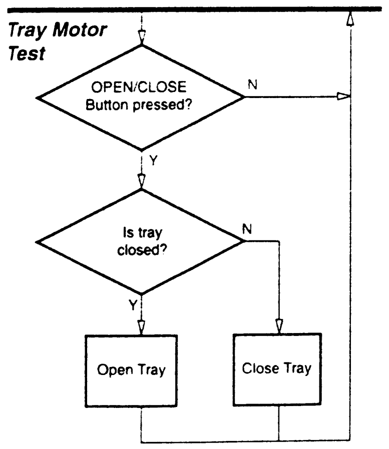
F = Fatal error & the set stop play function W = Warning

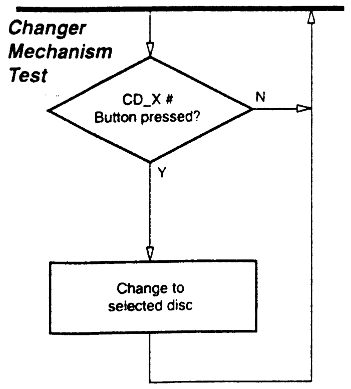
* For Logic set only.

Table 3


Sledge Motor Test
NEXT Button pressed?
N
PREVIOUS Button pressed?
Y
Y
Sledge moves outside Display shows "SLD 0"
Sledge moves inside Display shows "SLD I"

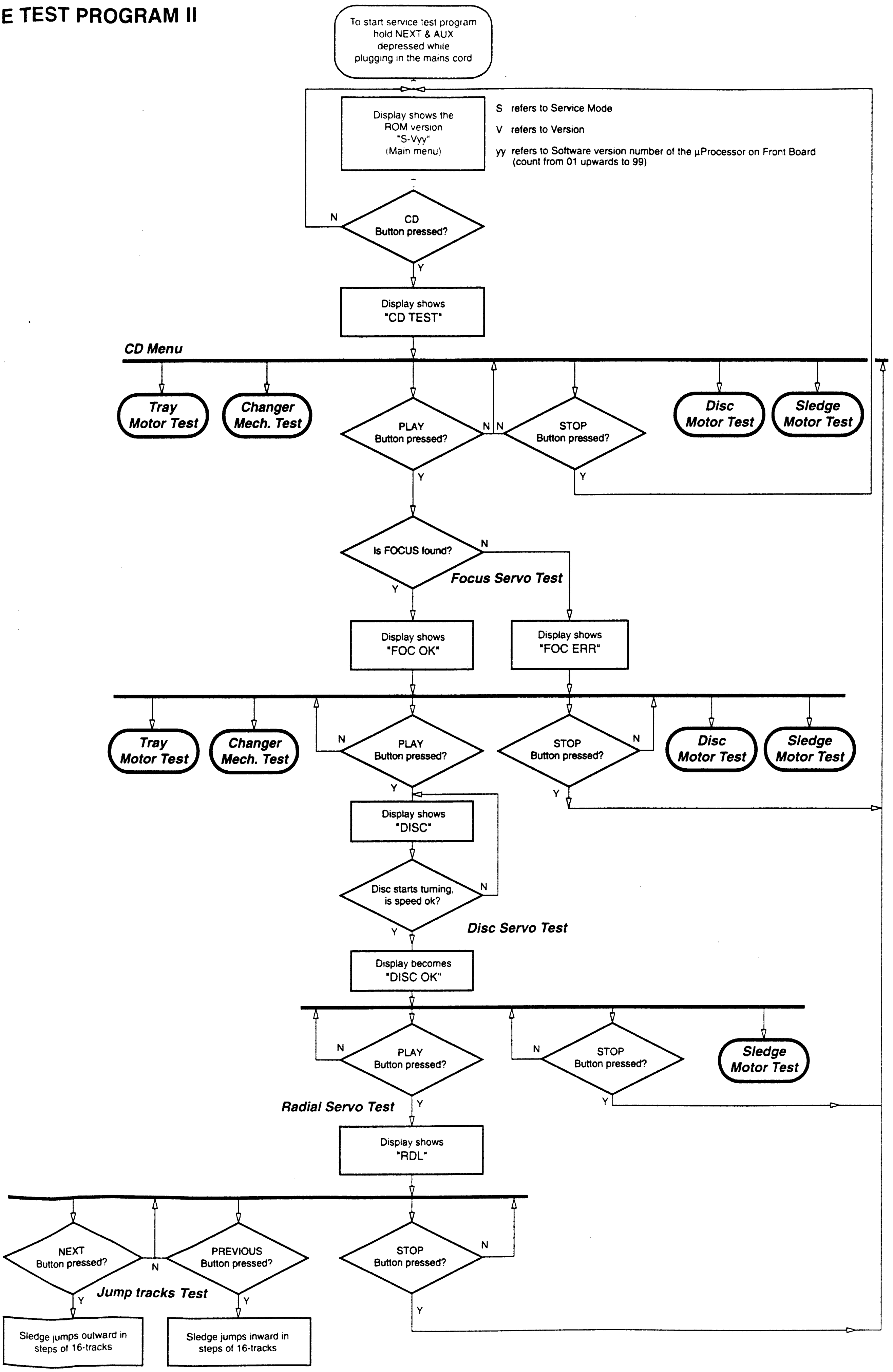

Disc Motor Test
LOUDNESS Button pressed?
N
N
PRESET Button pressed?
Y
Y
Disc Motor turns Counter Clockwise & Display shows "CCW"
Disc Motor turns Clockwise & Display shows "CW"


Tray Motor Test
OPEN/CLOSE Button pressed?
N
Y
Is tray closed?
N
Y
Open Tray
Close Tray


Changer Mechanism Test
CD_X # Button pressed?
N
Y
Change to selected disc

# CD_X refers to CD1, CD2 or CD3

SERVICE TEST PROGRAM II

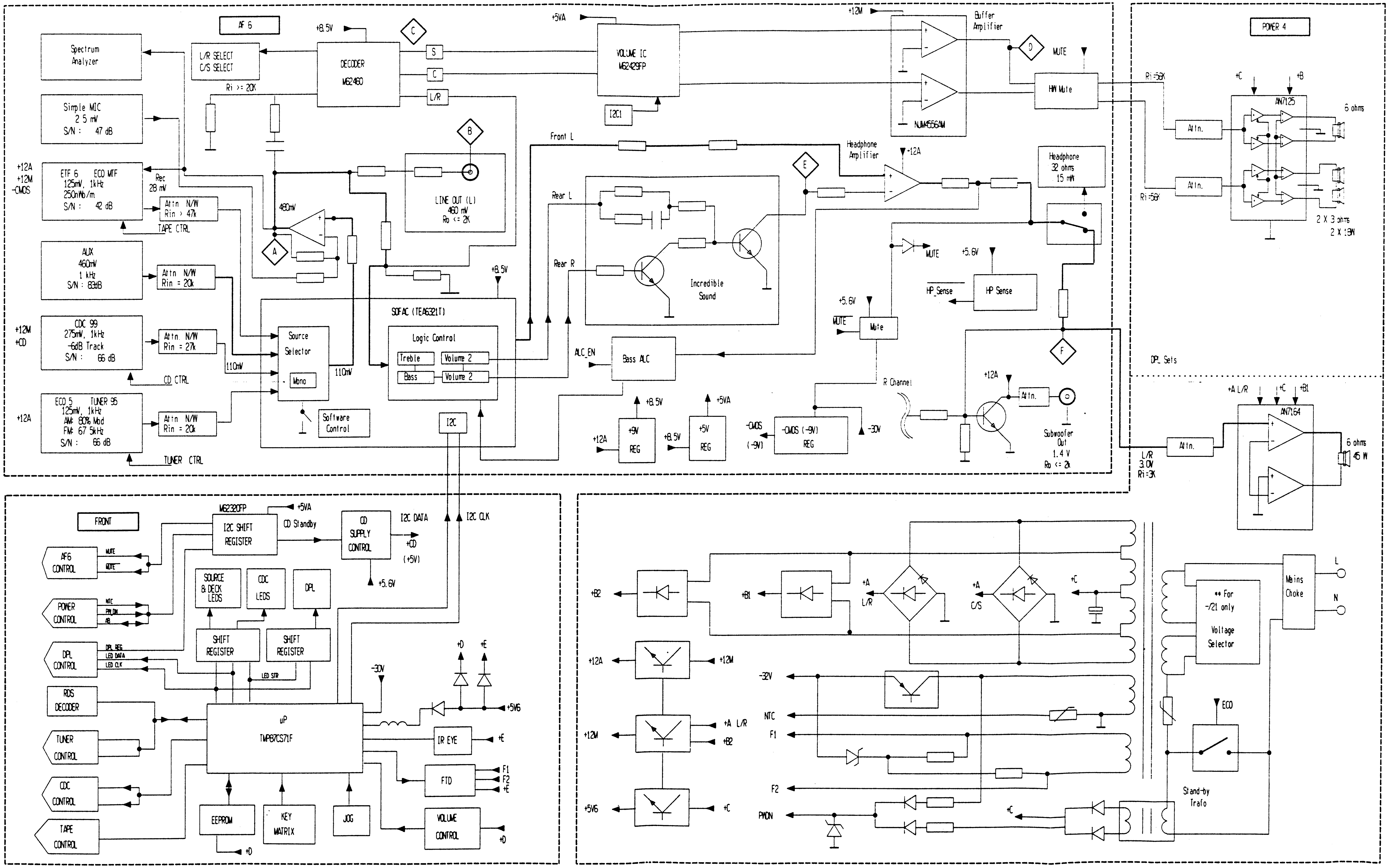

To start service test program hold NEXT & AUX depressed while plugging in the mains cord
Display shows the ROM version "S-Vyy" (Main menu)
N
CD Button pressed?
Y
Display shows "CD TEST"
CD Menu
Tray Motor Test
Changer Mech. Test
PLAY Button pressed?
N
N
STOP Button pressed?
Y
Y
Disc Motor Test
Sledge Motor Test
Is FOCUS found?
N
Y
Focus Servo Test
Display shows "FOC OK"
Display shows "FOC ERR"
Tray Motor Test
Changer Mech. Test
N
PLAY Button pressed?
STOP Button pressed?
N
Disc Motor Test
Sledge Motor Test
Y
Y
Display shows "DISC"
Disc starts turning, is speed ok?
N
Y
Disc Servo Test
Display becomes "DISC OK"
N
PLAY Button pressed?
N
STOP Button pressed?
Sledge Motor Test
Radial Servo Test
Y
Y
Display shows "RDL"
NEXT Button pressed?
N
PREVIOUS Button pressed?
STOP Button pressed?
N
Jump tracks Test
Y
Y
Y
Sledge jumps outward in steps of 16-tracks
Sledge jumps inward in steps of 16-tracks

S refers to Service Mode

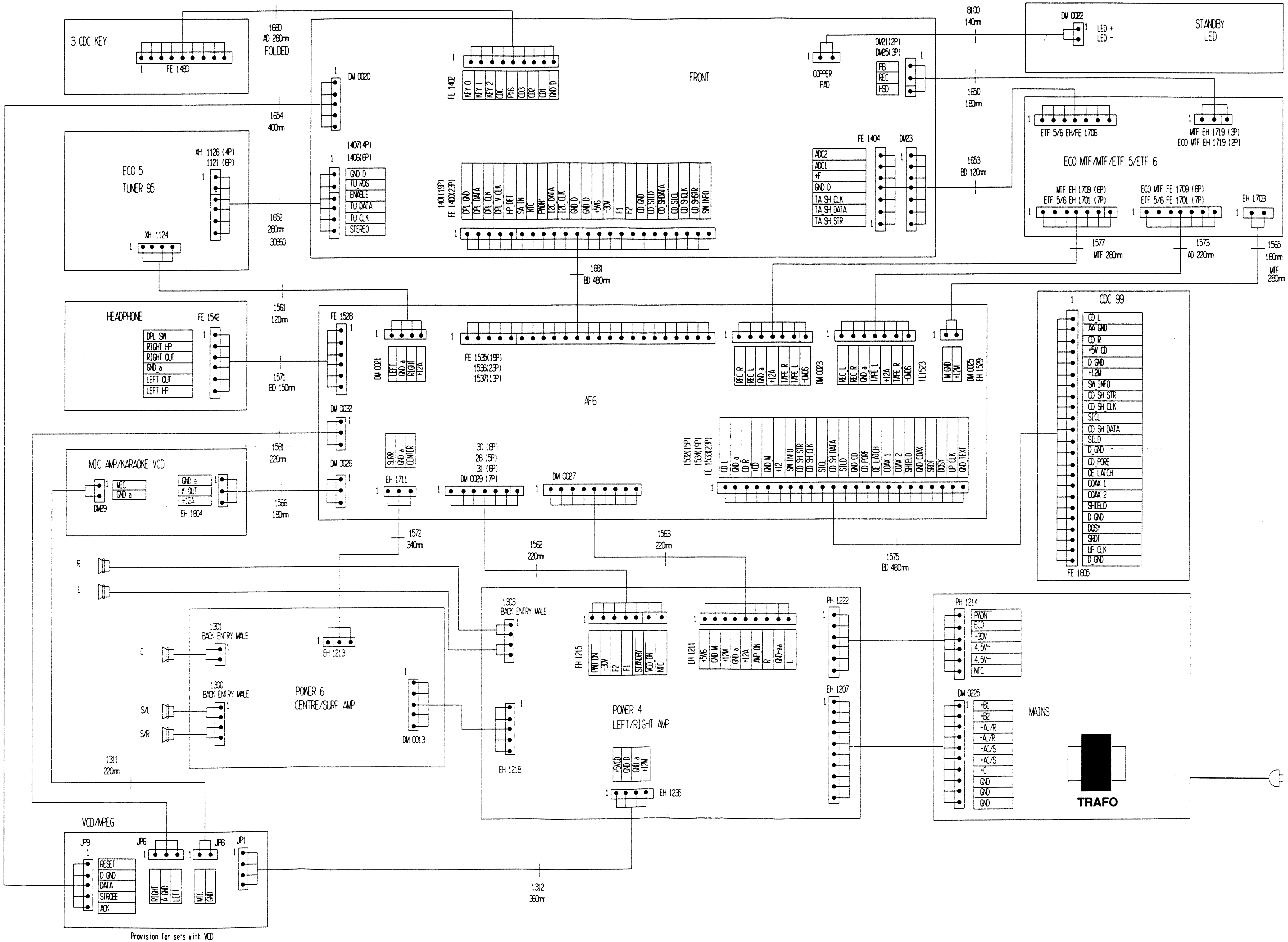
V refers to Version

yy refers to Software version number of the µProcessor on Front Board (count from 01 upwards to 99)

SET BLOCK DIAGRAM


AF 6
Spectrum Analyzer
L/R SELECT
C/S SELECT
+8.5V
DECODER
M62460
C
S
C
L/R
Ri >= 20K
Simple MIC
2.5 mV
S/N : 47 dB
B
+12A
+12M
-CMOS
ETF 6 ECO MTF
125mV, 1kHz
250nWb/m
S/N : 42 dB
Rec
28 mV
Attn N/W
Rin > 47k
TAPE CTRL
480mV
A
LINE OUT (L)
460 mV
Ro <= 2K
AUX
460mV
1 kHz
S/N : 83dB
Attn N/W
Rin = 20k
+8.5V
SOFAC (TEA6321T)
+12M
+CD
CDC 99
275mV, 1kHz
-6dB Track
S/N : 66 dB
Attn. N/W
Rin = 27k
110mV
Source
Selector
Mono
110mV
Logic Control
Treble
Bass
Volume 2
Volume 2
CD CTRL
+12A
ECO 5 TUNER 95
125mV, 1kHz
AM: 80% Mod
FM: 67.5kHz
S/N : 66 dB
Attn N/W
Rin = 20k
Software Control
I2C
TUNER CTRL
+5VA
VOLUME IC
M62429FP
I2C1
+12M
Buffer Amplifier
NJM4556AM
D
MUTE
HW Mute
Front L
Rear L
Rear R
Incredible Sound
E
Headphone Amplifier
+12A
Headphone
32 ohms
15 mW
MUTE
+5.6V
HP_Sense
HP Sense
+5.6V
MUTE
Mute
ALC_EN
Bass ALC
F
R Channel
+12A
Attn.
Subwoofer Out
1.4 V
Ro <= 2k
+8.5V
+5VA
+12A
+9V
REG
+8.5V
+5V
REG
-CMOS
(-9V)
-CMOS (-9V)
REG
-30V
POWER 4
Ri=56K
+C
+B
AN7125
Attn.
Attn.
Ri=56K
6 ohms
2 X 3 ohms
2 X 13W
DPL Sets
+A L/R
+C
+B1
AN7164
Attn.
L/R
3.0V
Ri=3K
6 ohms
45 W
FRONT
M62320FP
+5VA
I2C SHIFT REGISTER
CD Standby
CD SUPPLY CONTROL
I2C DATA
I2C CLK
+CD
(+5V)
+5.6V
AF6 CONTROL
MUTE
MUTE
POWER CONTROL
NTC
PWDN
AB
SOURCE & DECK LEDS
CDC LEDS
DPL
SHIFT REGISTER
SHIFT REGISTER
DPL CONTROL
DPL REG
LED DATA
LED CLK
LED STR
-30V
+D
+E
RDS DECODER
uP
TMP87CS71F
+5V6
TUNER CONTROL
IR EYE
+E
CDC CONTROL
FTD
F1
F2
+E
TAPE CONTROL
EEPROM
KEY MATRIX
JOG
VOLUME CONTROL
+D
+D
+B2
+B1
+A
L/R
+A
C/S
+C
Mains Choke
L
N
** For
-/21 only
Voltage Selector
+12A
+12M
-32V
NTC
+12M
+A L/R
+B2
F1
ECO
F2
+5V6
+C
PWDN
+C
Stand-by Trafo

SET WIRING DIAGRAM


3 CDC KEY
FE 1480
1680
AD 280mm
FOLDED
FRONT
FE 1402
KEY 0
KEY 1
KEY 2
CDC
P16
CD3
CD2
CD1
GND D
DM 0020
1654
400mm
ECO 5
TUNER 95
XH 1126 (4P)
1121 (6P)
XH 1124
1652
280mm
30650
1407(4P)
1406(6P)
GND D
TU RDS
ENABLE
TU DATA
TU CLK
STEREO
1401(19P)
FE 1400(23P)
DPL GND
DPL DATA
DPL CLK
DPL V CLK
HP DET
SA IN
NTC
PWDN
I2C DATA
I2C CLK
GND D
GND D
+5V6
-30V
F1
F2
CD GND
CD SILD
CD SHDATA
CD SICL
CD SHCLK
CD SHSTR
SW INFO
COPPER
PAD
DM21(2P)
DM25(3P)
PB
REC
HSD
FE 1404
DM23
ADC2
ADC1
+F
GND D
TA SH CLK
TA SH DATA
TA SH STR
8100
140mm
1650
180mm
1653
BD 120mm
DM 0022
LED +
LED -
STANDBY
LED
ETF 5/6 EH/FE 1706
MTF EH 1719 (3P)
ECO MTF EH 1719 (2P)
ECO MTF/MTF/ETF 5/ETF 6
MTF EH 1709 (6P)
ETF 5/6 EH 1701 (7P)
ECO MTF FE 1709 (6P)
ETF 5/6 FE 1701 (7P)
EH 1703
1577
MTF 280mm
1573
AD 220mm
1565
180mm
MTF
280mm
1681
BD 480mm
HEADPHONE
FE 1542
DPL SW
RIGHT HP
RIGHT OUT
GND a
LEFT OUT
LEFT HP
1561
120mm
1571
BD 150mm
FE 1528
DM 0021
LEFT
GND a
RIGHT
+12A
FE 1535(19P)
1536(23P)
1537(13P)
AF6
REC R
REC L
GND a
+12A
TAPE R
TAPE L
+DADS
DM 0023
REC L
REC R
GND a
TAPE L
+12A
TAPE R
+DADS
FE1523
M GND
+12M
DM 0025
EH 1529
DM 0032
1581
220mm
DM 0026
SURR
GND a
CENTER
EH 1711
30 (8P)
28 (5P)
31 (6P)
DM 0029 (7P)
DM 0027
1532(15P)
1534(19P)
FE 1533(23P)
CD L
GND a
CD R
+CD
GND M
+12
SW INFO
CD SH STR
CD SH CLK
SICL
CD SH DATA
SILD
GND CD
CD PORE
OE LATCH
COAX 1
COAX 2
SHIELD
GND COAX
SPDT
DOSY
UP CLK
GND TEXT
MIC AMP/KARAOKE VCD
MIC
GND a
DM29
GND a
+ OUT
+12A
EH 1904
1566
180mm
1572
340mm
1562
220mm
1563
220mm
1575
BD 480mm
CDC 99
CD L
AA GND
CD R
+5V CD
D GND
+12M
SW INFO
CD SH STR
CD SH CLK
SICL
CD SH DATA
SILD
D GND
CD PORE
OE LATCH
COAX 1
COAX 2
SHIELD
D GND
DOSY
SPDT
UP CLK
D GND
FE 1805
R
L
C
S/L
S/R
1301
BACK ENTRY MALE
1300
BACK ENTRY MALE
EH 1213
POWER 6
CENTRE/SURF AMP
DM 0013
1303
BACK ENTRY MALE
EH 1215
PWD DN
-30V
F2
F1
STANDBY
VCD ON
NTC
EH 1211
+5V6
GND M
+12M
GND a
+12A
AMP ON
R
GND-aa
L
EH 1216
POWER 4
LEFT/RIGHT AMP
+5VCD
GND D
GND a
+12M
EH 1235
PH 1222
EH 1207
PH 1214
PWDN
ECO
-30V
4.5V~
4.5V~
NTC
DM 0225
+B1
+B2
+AL/R
+AL/R
+AC/S
+AC/S
+C
GND
GND
GND
MAINS
TRAFO
1311
220mm
1312
360mm
VCD/MPEG
JP9
JP6
JP8
JP1
RESET
D GND
DATA
STROBE
ACK
RIGHT
A GND
LEFT
MIC
GND
Provision for sets with VCD

FRONT BOARD

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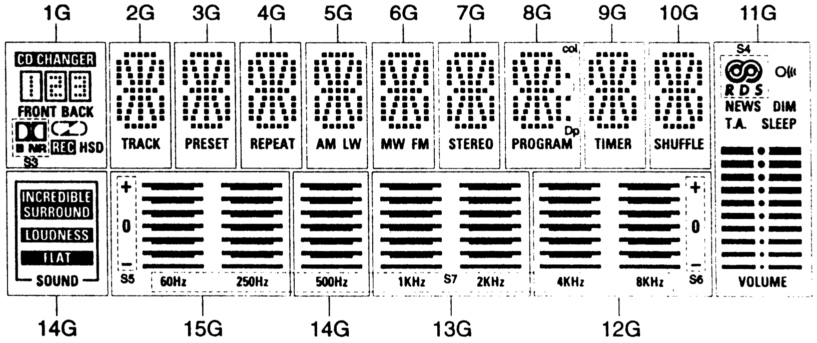
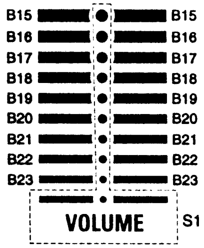
Front Board - Circuit diagram & Variations table 6-3
Key-CDC part - Layouts & Circuit diagram 6-4
Electrical parts list... 6-5

FTD DISPLAY PIN CONNECTIONS

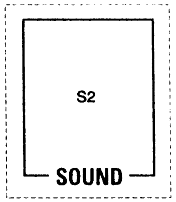


1G
2G
3G
4G
5G
6G
7G
8G
9G
10G
11G
CD CHANGER
FRONT BACK
NR
REC
HSD
S3
TRACK
PRESET
REPEAT
AM LW
MW FM
STEREO
col
Dp
PROGRAM
TIMER
SHUFFLE
S4
RDS
NEWS DIM
T.A. SLEEP
INCREDIBLE SURROUND
LOUDNESS
FLAT
SOUND
+
0
–
S5
60Hz
250Hz
500Hz
1KHz
S7
2KHz
4KHz
8KHz
S6
VOLUME
14G
15G
14G
13G
12G

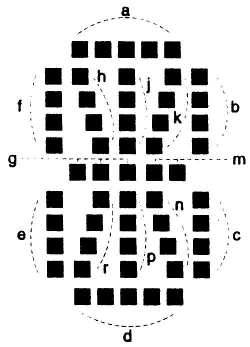


B15
B16
B17
B18
B19
B20
B21
B22
B23
VOLUME
S1

(11G)

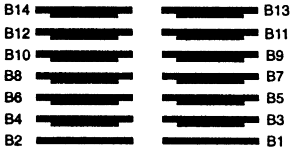


(14G)



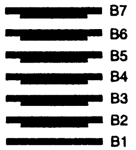
a
h
j
k
f
b
g
m
n
e
c
r
p
d

(2G~10G)



B14
B12
B10
B8
B6
B4
B2
B13
B11
B9
B7
B5
B3
B1

(12G , 13G , 15G)



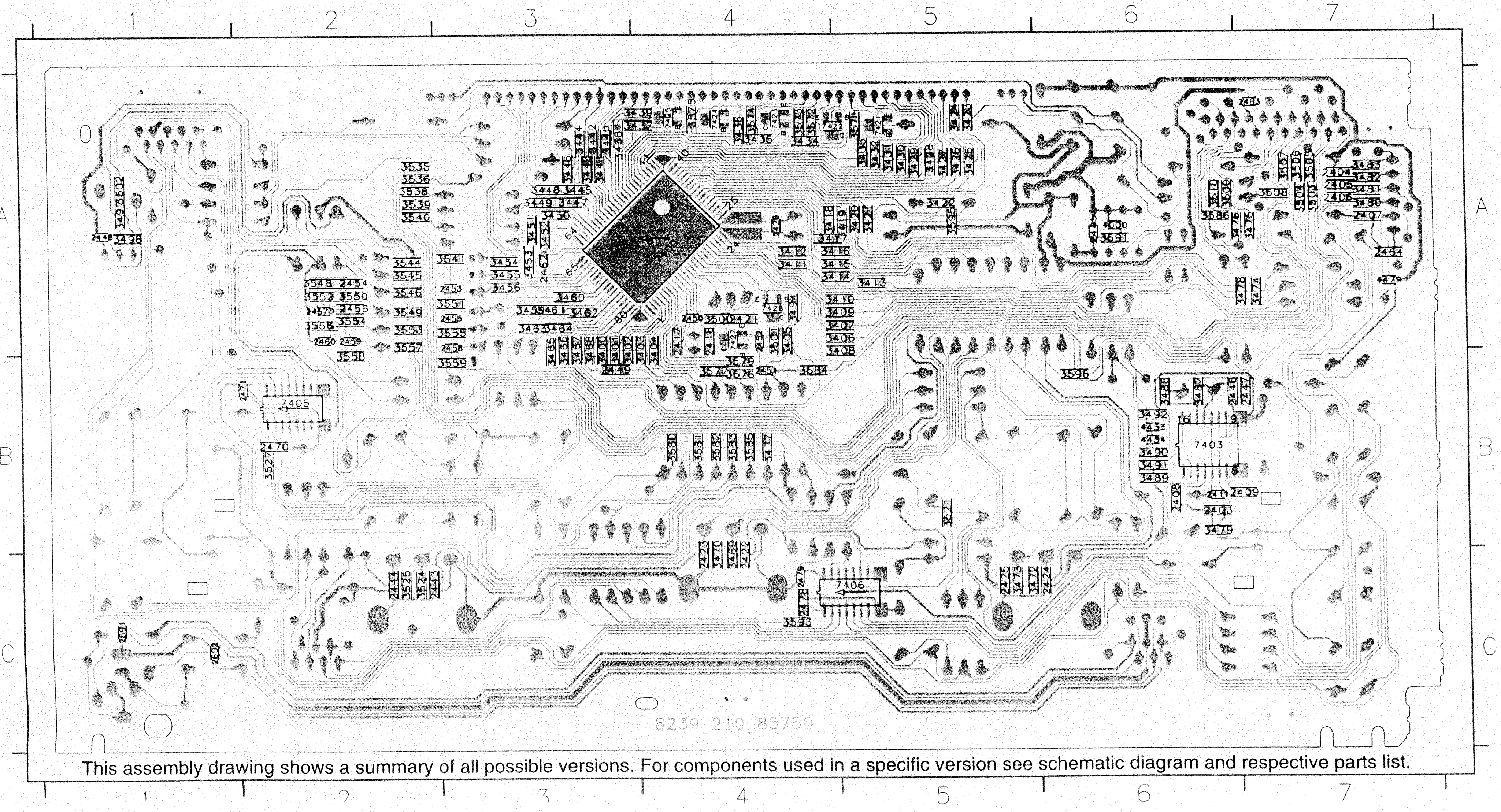
B7
B6
B5
B4
B3
B2
B1

(14G)

	15G	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	B1	B1	B1	B1	S4	a	a	a	a	a	a	a	a	a	CD CHANGER
P2	B2	B2	B2	B2	O(((	h	h	h	h	h	h	h	h	h	⋮
P3	B3	B3	B3	B3	DIM	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p	▯ (1)
P4	B4	B4	B4	B4	NEWS	k	k	k	k	k	k	k	k	k	⁞
P5	B5	B5	B5	B5	T.A.	b	b	b	b	b	b	b	b	b	▯ (2)
P6	B6	B6	B6	B6	SLEEP	f	f	f	f	f	f	f	f	f	⁞
P7	B7	B7	B7	B7	B15	m	m	m	m	m	m	m	m	m	▯ (3)
P8	B8	S7	B8	B8	B16	g	g	g	g	g	g	g	g	g	BACK
P9	B9	-	B9	B9	B17	c	c	c	c	c	c	c	c	c	FRONT
P10	B10	-	B10	B10	B18	e	e	e	e	e	e	e	e	e	S3
P11	B11	-	B11	B11	B19	r	r	r	r	r	r	r	r	r	(
P12	B12	S2	B12	B12	B20	n	n	n	n	n	n	n	n	n	Z
P13	B13	INCREDIBLE SURROUND	B13	B13	B21	d	d	d	d	d	d	d	d	d	)
P14	B14	LOUDNESS	B14	B14	B22	SHUFFLE	TIMER	PROGRAM	STEREO	MW	AM	REPEAT	PRESET	TRACK	REC
P15	S7	FLAT	S7	S7	B23	-	-	col	-	FM	LW	-	-	-	HSD
P16	S5	-	-	S6	S1	-	-	Dp	-	-	-	-	-	-	-

FRONT BOARD - CHIP LAYOUT

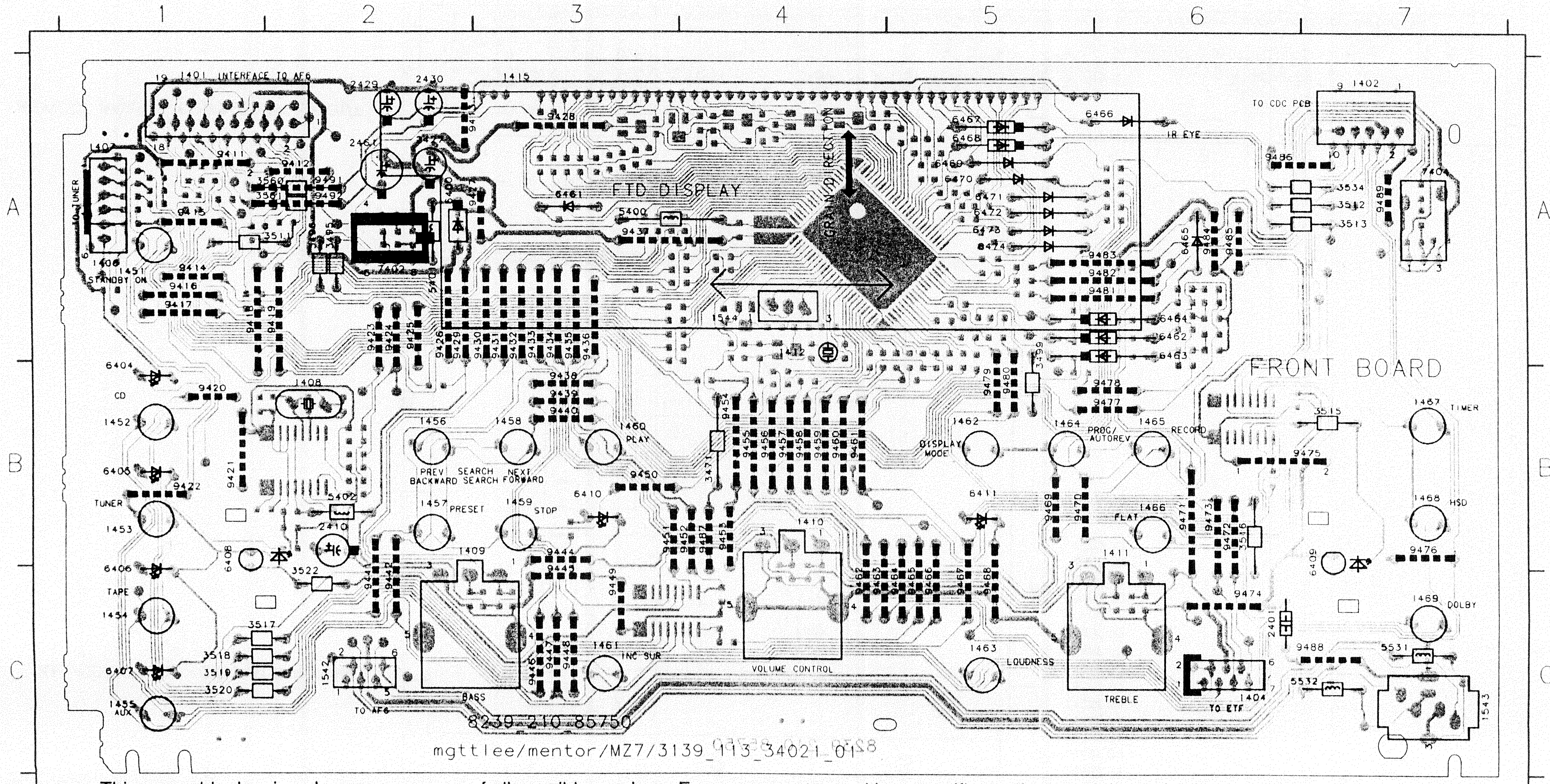
2403	B6
2404	A7
2405	A7
2406	A7
2407	A7
2408	B6
2409	B7
2411	B6
2417	A4
2418	A4
2421	A4
2422	C4
2423	C4
2424	C6
2425	C5
2426	A4
2443	C2
2444	C2
2445	A6
2446	B6
2447	B7
2448	A1
2449	B3
2450	A4
2451	B4
2452	A4
2453	A3
2454	A2
2455	A3
2456	A2
2457	A2
2458	A3
2459	A2
2460	A2
2462	A3
2463	A7
2464	A7
2470	B2
2471	B2
2478	C4
2479	C4
2691	C1
2692	C1
3400	A3
3401	A3
3402	A3
3403	A4
3404	A4
3405	A4
3406	A5
3407	A5
3408	A5
3409	A5
3410	A5
3411	A4
3412	A4
3413	A5
3414	A5
3415	A5
3416	A5
3417	A4
3418	A4
3419	A5
3420	A5
3421	A5
3422	A5
3423	A5
3424	A5
3425	A5
3426	A5
3427	A5
3428	A5
3429	A5
3430	A5
3431	A5
3432	A5
3433	A5
3434	A4
3435	A4
3436	A4
3437	A4
3438	A3
3439	A4
3440	A3
3441	A3
3442	A3
3443	A3
3444	A3
3445	A3
3446	A3
3447	A3
3448	A3
3449	A3
3450	A3
3451	A3
3452	A3
3453	A3
3454	A3
3455	A3
3456	A3
3459	A3
3460	A3
3461	A3
3462	A3
3463	A3
3464	A3
3465	A3
3466	A3
3467	A3
3468	A3
3469	C4
3470	C4
3472	C5
3473	C5
3474	A7
3475	A7
3476	A7
3477	B4
3478	A7
3479	B6
3480	A7
3481	A7
3482	A7
3483	A7
3487	B6
3488	B6
3489	B6
3490	B6
3491	B6
3492	B6
3494	A4
3497	A1
3498	A1
3500	A4
3501	A4
3502	A1
3503	A7
3504	A7
3505	A7
3506	A7
3507	A7
3508	A7
3509	A6
3510	A6
3521	B5
3524	C2
3525	C2
3527	B2
3535	A2
3536	A2
3538	A2
3539	A2
3540	A2
3541	A3
3544	A2
3545	A2
3546	A2
3548	A2
3549	A2
3550	A2
3551	A3
3552	A2
3553	A2
3554	A2
3555	A3
3556	A2
3557	A2
3558	B2
3559	B3
3571	A5
3572	A4
3573	A4
3574	A4
3575	A4
3576	B4
3577	B4
3579	B4
3580	B4
3581	B4
3582	B4
3583	B4
3584	B4
3585	B4
3586	A6
3591	A6
3593	C4
3595	A5
3596	B6
4000	A6
4453	B6
4454	B6
4479	A7
7400	A4
7403	B6
7405	B2
7406	C5
7421	A5
7422	A5
7423	A4
7424	A4
7425	A4
7427	A4
7428	A4



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

FRONT BOARD - COMPONENT LAYOUT

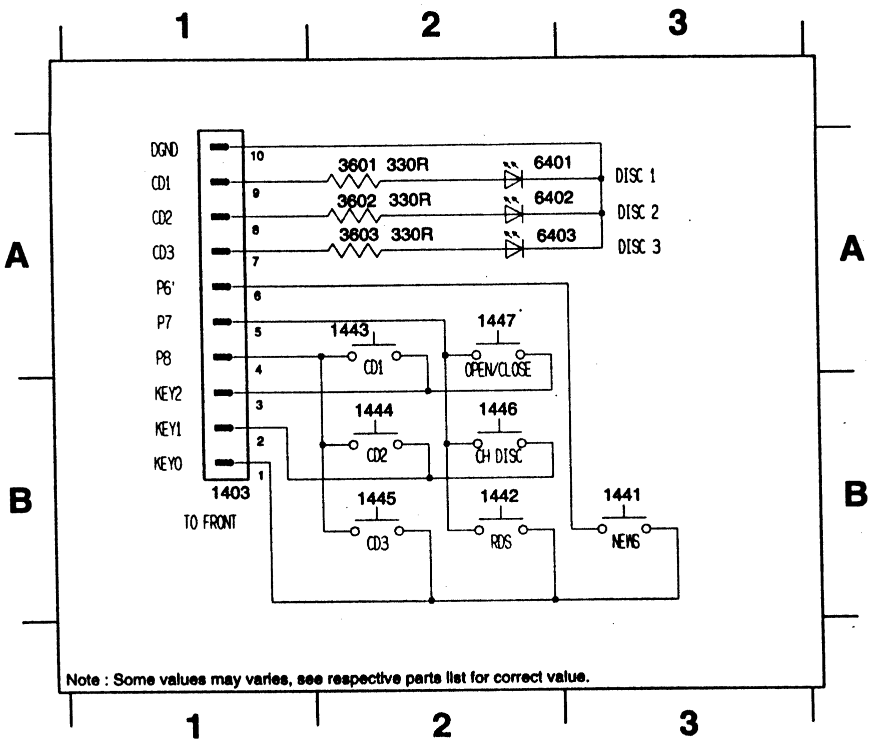
1401	A1
1402	A7
1404	C6
1406	A1
1407	A1
1408	B2
1409	B2
1410	B4
1411	B6
1412	A4
1415	A3
1451	A1
1452	B1
1453	B1
1454	C1
1455	C1
1456	B2
1457	B2
1458	B3
1459	B3
1460	B3
1461	C3
1462	B5
1463	C5
1464	B5
1465	B6
1466	B6
1467	B7
1468	B7
1469	C7
1542	C2
1543	C7
1544	A4
2401	C6
2410	B2
2427	A2
2429	A2
2430	A2
2461	A2
3471	B4
3495	A2
3496	A2
3499	A5
3511	A2
3512	A7
3513	A7
3515	B7
3516	B6
3517	C1
3518	C1
3519	C1
3520	C1
3522	C2
3534	A7
3560	A2
3561	A2
5400	A3
5401	A2
5402	B2
5531	C7
5532	C7
6400	A2
6404	B1
6405	B1
6406	C1
6407	C1
6408	B1
6409	B7
6410	B3
6411	B5
6461	A3
6462	A6
6463	A6
6464	A6
6465	A6
6466	A6
6467	A5
6468	A5
6469	A5
6470	A5
6471	A5
6472	A5
6473	A5
6474	A5
7402	A2
7404	A7
9411	A1
9412	A2
9413	A2
9414	A1
9415	A1
9416	A1
9417	A1
9418	A1
9419	A2
9420	B1
9421	B1
9422	B1
9423	A2
9424	A2
9425	A2
9426	A2
9427	A2
9428	A3
9429	A2
9430	A3
9431	A3
9432	A3
9433	A3
9434	A3
9435	A3
9436	A3
9437	A3
9438	B3
9439	B3
9440	B3
9441	C2
9442	C2
9444	B3
9445	C3
9446	C3
9447	C3
9448	C3
9449	C3
9450	B3
9451	B3
9452	B4
9453	B4
9454	B4
9455	B4
9456	B4
9457	B4
9458	B4
9459	B4
9460	B4
9461	B4
9462	C4
9463	C4
9464	C5
9465	C5
9466	C5
9467	C5
9468	C5
9469	B5
9470	B5
9471	B6
9472	B6
9473	B6
9474	C6
9475	B7
9476	B7
9477	B6
9478	B6
9479	B5
9480	B5
9481	A6
9482	A6
9483	A6
9484	A6
9485	A6
9486	A6
9487	B4
9488	C7
9489	A7
9491	A2
9492	A2


1
2
3
4
5
6
7
A
B
C
1401 INTERFACE TO AF6
1415
1402
TO CDC PCB
IR EYE
FTD DISPLAY
GRAIN DIRECTION
TO TUNER
STANDBY ON
FRONT BOARD
CD
TUNER
TAPE
AUX
PREV BACKWARD
SEARCH SEARCH
NEXT FORWARD
PRESET
STOP
PLAY
INC SUR
BASS
TO AF6
VOLUME CONTROL
LOUDNESS
TREBLE
TO ETF
DISPLAY MODE
PROG/ AUTOREV
RECORD
FLAT
TIMER
HSD
DOLBY
8239 210 85750
mgttlee/mentor/MZ7/3139_113_34021_01

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

KEY-CDC PART

KEY-CDC BOARD - CIRCUIT DIAGRAM

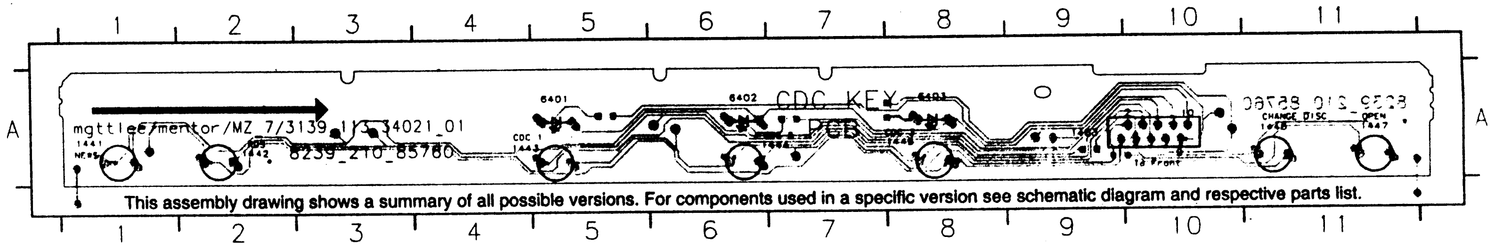

1
2
3
A
B
DGND
CD1
CD2
CD3
P6'
P7
P8
KEY2
KEY1
KEY0
10
9
8
7
6
5
4
3
2
1
1403
TO FRONT
3601 330R
3602 330R
3603 330R
6401
6402
6403
DISC 1
DISC 2
DISC 3
1443
CD1
1447
OPEN/CLOSE
1444
CD2
1446
CH DISC
1445
CD3
1442
RDS
1441
NEWS

Note : Some values may varies, see respective parts list for correct value.

1403	B1
1441	B3
1442	B2
1443	A2
1444	B2
1445	B2
1446	B2
1447	A2
3601	A2
3602	A2
3603	A2
6401	A2
6402	A2
6403	A2

KEY-CDC BOARD - COMPONENT LAYOUT

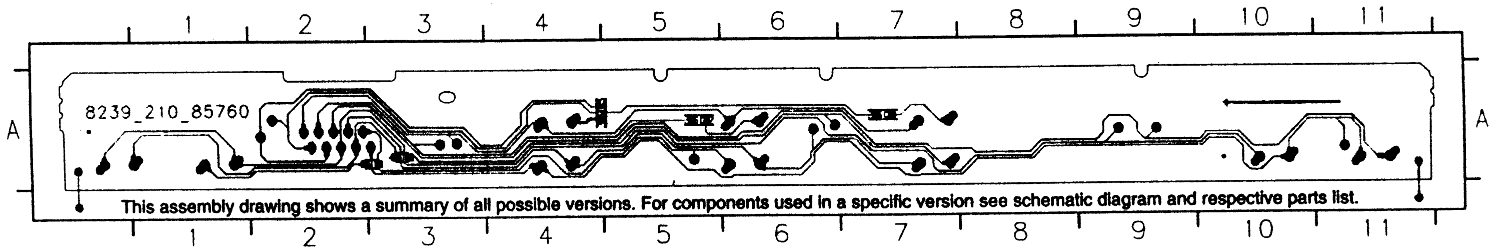
1403	A9
1441	A1
1442	A2
1443	A4
1444	A7
1445	A8
1446	A11
1447	A11
6401	A5
6402	A6
6403	A8


1
2
3
4
5
6
7
8
9
10
11
A
mgttlee/mentor/MZ_7/3139_113_34021_01
8239_210_85760
CDC KEY PCB
1441 NEWS
RDS 1442
CDC 1 1443
6401
6402
6403
CDC 2 1444
1445
To Front
CHANGE DISC 1446
OPEN 1447

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

KEY-CDC BOARD - CHIP LAYOUT

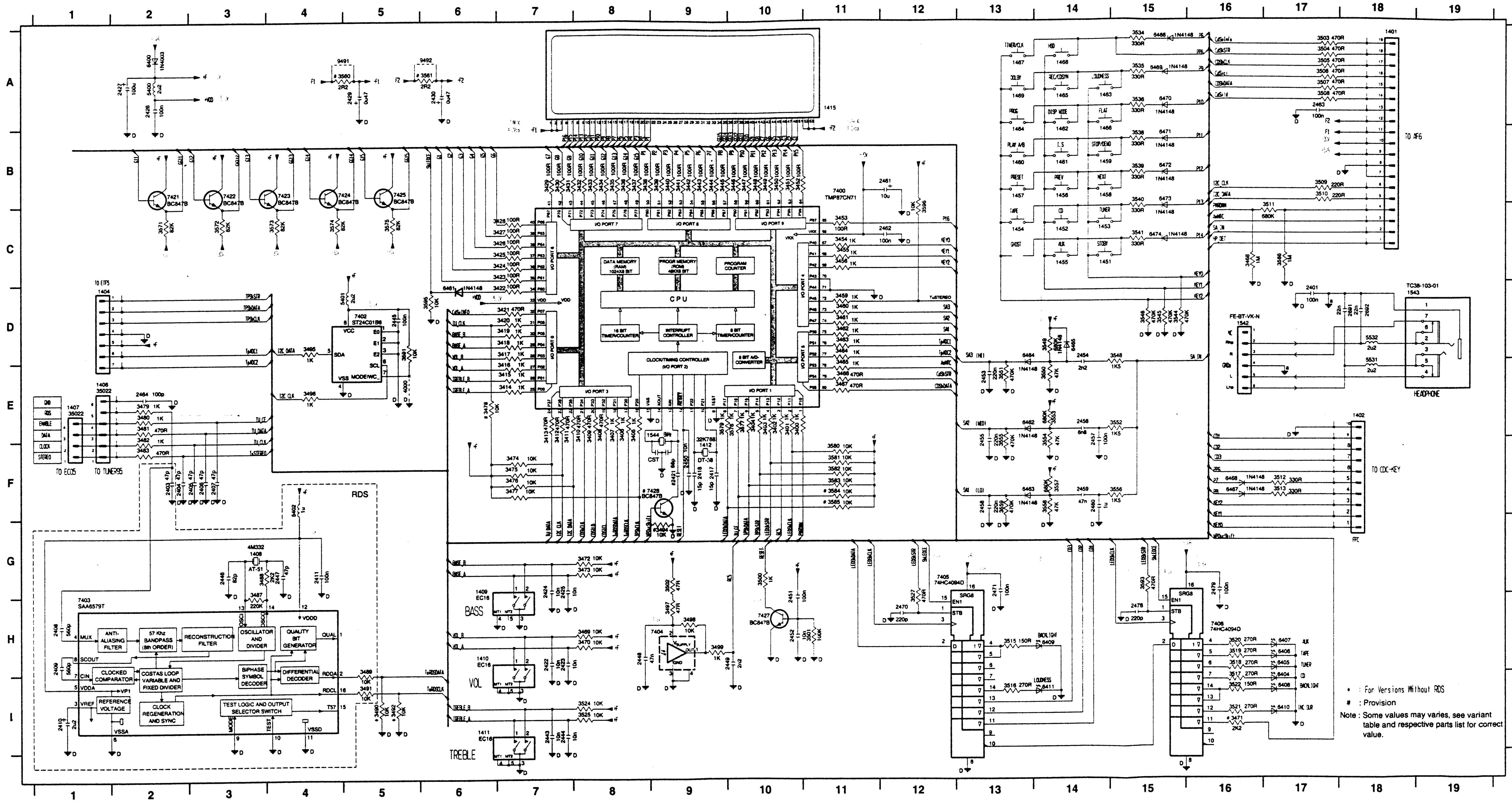
3601	A7
3602	A5
3603	A4
4411	A3
4412	A3


1
2
3
4
5
6
7
8
9
10
11
A
8239_210_85760

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

FRONT BOARD - CIRCUIT DIAGRAM

1401	A18
1402	E18
1404	D1
1406	E1
1407	E1
1408	G3
1409	G6
1410	H6
1411	I6
1412	F9
1415	A11
1451	C14
1452	C14
1453	C14
1454	C13
1455	C14
1456	B14
1457	B13
1458	B14
1459	B14
1460	B13
1461	B14
1462	B14
1463	A14
1464	B13
1465	A14
1466	B14
1467	A13
1468	A14
1469	A13
1542	D16
1543	D18
1544	E9
2401	D17
2403	F2
2404	F2
2405	F3
2406	F3
2407	F3
2408	H1
2409	H1
2410	I1
2411	G4
2417	F9
2418	F9
2421	F9
2422	H7
2423	H7
2424	G7
2425	G7
2426	A2
2427	A2
2429	A5
2430	A6
2443	I7
2444	I7
2445	D6
2446	G3
2447	G4
2448	H8
2449	H10
2450	F9
2451	H10
2452	H10
2453	E13
2454	D14
2455	F13
2456	E14
2457	F14
2458	F13
2459	F14
2460	F14
2461	B12
2462	C12
2463	A17
2464	E2
2470	H12
2471	G13
2478	H15
2479	G16
2691	D18
2692	D18
3400	E10
3401	E10
3402	E10
3403	E10
3404	E10
3405	E8
3406	E8
3407	E8
3408	E8
3409	E8
3410	E8
3411	E7
3412	E7
3413	E7
3414	E7
3415	E7
3416	E7
3417	D7
3418	D7
3419	D7
3420	D7
3421	D7
3422	D7
3423	C7
3424	C7
3425	C7
3426	C7
3427	C7
3428	C7
3429	B7
3430	B7
3431	B7
3432	B8
3433	B8
3434	B8
3435	B8
3436	B8
3437	B8
3438	B8
3439	B9
3440	B9
3441	B9
3442	B9
3443	B9
3444	B9
3445	B9
3446	B10
3447	B10
3448	B10
3449	B10
3450	B10
3451	B10
3452	B10
3453	C11
3454	C11
3455	C11
3456	C11
3459	D11
3460	D11
3461	D11
3462	D11
3463	D11
3464	D11
3465	D11
3466	E11
3467	E11
3468	C16
3469	H8
3470	H8
3471	I16
3472	G8
3473	G8
3474	F7
3475	F7
3476	F7
3477	F7
3478	E6
3479	E2
3480	E2
3481	E2
3482	E2
3483	F2
3487	G3
3488	G3
3489	H5
3490	I5
3491	I5
3492	I5
3494	G9
3495	D4
3496	E4
3497	H9
3498	H9
3499	H9
3500	G10
3501	H11
3502	G9
3503	A17
3504	A17
3505	A17
3506	A17
3507	A17
3508	A17
3509	B17
3510	B17
3511	C17
3512	F17
3513	F17
3515	H13
3516	I13
3517	H16
3518	H16
3519	H16
3520	H16
3521	I16
3522	I16
3524	I8
3525	I8
3527	H12
3534	A15
3535	A15
3536	A15
3538	B15
3539	B15
3540	B15
3541	C15
3544	D15
3545	D15
3546	D15
3548	D15
3549	D14
3550	E14
3551	E13
3552	E15
3553	E14
3554	F14
3555	F13
3556	F15
3557	F14
3558	F14
3559	F13
3560	A5
3561	A6
3571	C2
3572	C3
3573	C4
3574	C4
3575	C5
3576	E10
3577	E10
3579	E9
3580	F11
3581	F11
3582	F11
3583	F11
3584	F11
3585	F11
3586	C17
3591	D6
3593	G15
3595	D6
3596	C12
4000	E5
5400	A2
5401	D6
5402	F4
5531	E18
5532	D18
6400	A2
6404	I17
6405	H17
6406	H17
6407	H17
6408	I17
6409	H14
6410	I17
6411	I14
6461	D6
6462	E13
6463	F13
6464	D13
6465	D14
6466	A15
6467	F16
6468	F16
6469	A15
6470	A15
6471	B15
6472	B15
6473	B15
6474	C15
7400	B11
7402	D5
7403	H1
7404	H9
7405	G12
7406	H16
7421	B2
7422	B3
7423	B4
7424	B4
7425	B6
7427	H10
7428	F8
9491	A5
9492	A6


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
A B C D E F G H I
7400
TMP87CN71
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 5
I/O PORT 4
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROG MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
8 BIT A/D-CONVERTER
7402
ST24C01B6
VCC
SDA
SCL
VSS
MODE/WC
7403
SAA6579T
ANTI-ALIASING FILTER
57 Khz BANDPASS (8th ORDER)
RECONSTRUCTION FILTER
OSCILLATOR AND DIVIDER
QUALITY BIT GENERATOR
CLOCKED COMPARATOR
COSTAS LOOP VARIABLE AND FIXED DIVIDER
BIPHASE SYMBOL DECODER
DIFFERENTIAL DECODER
REFERENCE VOLTAGE
CLOCK REGENERATION AND SYNC
TEST LOGIC AND OUTPUT SELECTOR SWITCH
RDS
4M332
1406
AT-51
7421 BC847B
7422 BC847B
7423 BC847B
7424 BC847B
7425 BC847B
7427 BC847B
7428 BC847B
7404
7405 74HC4094D
7406 74HC4094D
SRG8
1404 TO ETF5
1406 35022
1407 35022
TO EC05
TO TUNER95
GND
RDS
ENABLE
DATA
CLOCK
STEREO
1409 EC16 BASS
1410 EC16 VOL
1411 EC16 TREBLE
1415
1401 TO AF6
1402 TO CDC-KEY
FFC
FE-BT-VK-N 1542
TC38-103-01 1543
HEADPHONE
TIMER/CLK
HSD
DOLBY
REC/CDSYN
LOUDNESS
PROG
DISP MODE
FLAT
PLAY A/B
I.S
STOP/DEMO
PRESET
PREV
NEXT
TAPE
CD
TUNER
GHOST
AUX
STDBY
1N4148
1N4003
32K768
DT-38
CST
8M
BACKLIGHT
LOUDNESS
AUX
TAPE
TUNER
CD
INC SUR

- * : For Versions Without RDS
- # : Provision

Note : Some values may varies, see variant table and respective parts list for correct value.

Variations table for Front Board

	MZ7/22	MZ7/37
1406	X	-
1407	-	X
1408	X	-
2403	47pF	-
2408	560pF	-

	MZ7/22	MZ7/37
2409	560pF	-
2410	2,2µF	-
2411	100nF	-
2446	82pF	-
2447	47pF	-

	MZ7/22	MZ7/37
2464	100pF	-
3469	10k	-
3479	1k	-
3487	220k	-
3488	2k2	-

	MZ7/22	MZ7/37
3490	-	10k
3491	10k	-
3492	-	10k
5402	X	-
7403	X	-

X = Item in use.

PCS 102 81

ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1401	482226511545	Flex Connector 19P
1402	482226511208	Flex Connector 10P
1403	482226710729	Flex Connector 10P
1404	482226710953	Flex Connector 7P
1408	482224272195	QUARZ 4,332 MHz
1409	482227310366	Rotary Encoder 24P
1410	482227310365	Rotary Encoder 24P
1411	482227310366	Rotary Encoder 24P
1412	242254301069	RES XTL 32kHZ768
1415	313911051960	FTD Display
1441	482227613775	Tact Switch
1442	482227613775	Tact Switch
1443	482227613775	Tact Switch
1444	482227613775	Tact Switch
1445	482227613775	Tact Switch
1446	482227613775	Tact Switch
1447	482227613775	Tact Switch
1451	482227613775	Tact Switch
1452	482227613775	Tact Switch
1453	482227613775	Tact Switch
1454	482227613775	Tact Switch
1455	482227613775	Tact Switch
1456	482227613775	Tact Switch
1457	482227613775	Tact Switch
1458	482227613775	Tact Switch
1459	482227613775	Tact Switch
1460	482227613775	Tact Switch
1461	482227613775	Tact Switch
1462	482227613775	Tact Switch
1463	482227613775	Tact Switch
1464	482227613775	Tact Switch
1465	482227613775	Tact Switch
1466	482227613775	Tact Switch
1467	482227613775	Tact Switch
1468	482227613775	Tact Switch
1469	482227613775	Tact Switch
1542	482226710731	Flex Connector 6P
1543	242202605059	Headphone Socket
1544	482224272066	Ceramic Resonator 8MHz

CAPACITORS

2401	482212613838	100nF +80/-20% 50V
2403	482212613692	47pF 1% 63V
2404	482212613692	47pF 1% 63V
2405	482212613692	47pF 1% 63V
2406	482212613692	47pF 1% 63V
2407	482212613692	47pF 1% 63V
2408	482212233173	560pF 10% 50V
2409	482212233173	560pF 10% 50V
2410	482212422652	2,2µF 20% 50V
2411	482212614585	100nF 10% 50V
2417	482212613486	15pF 2% 63V
2418	482212613486	15pF 2% 63V
2422	482212233177	10nF 20% 50V
2423	482212233177	10nF 20% 50V
2424	482212233177	10nF 20% 50V
2425	482212233177	10nF 20% 50V
2426	482212613838	100nF +80/-20% 50V
2427	482212442234	100µF 20% 6,3V
2429	532212441948	470nF 20% 50V
2430	532212441948	470nF 20% 50V
2443	482212233177	10nF 20% 50V
2444	482212233177	10nF 20% 50V
2445	482212614585	100nF 10% 50V
2446	482212613695	82pF 1% 63V
2447	482212613692	47pF 1% 63V
2448	482212613751	47nF 10% 63V
2449	482212233127	2,2nF 10% 63V
2450	532212234098	10nF 10% 63V
2451	482212614585	100nF 10% 50V
2452	532212234098	10nF 10% 63V
2453	482212614076	220nF +80/-20% 25V
2454	482212233127	2,2nF 10% 63V
2455	482212614076	220nF +80/-20% 25V
2456	532212231866	6,8nF 10% 63V
2457	482212614585	100nF 10% 50V
2458	482212614076	220nF +80/-20% 25V
2459	482212613751	47nF 10% 63V
2460	482212614043	1µF +80/-20% 16V
2461	482212412255	10µF 20% 50V
2462	482212613838	100nF +80/-20% 50V
2463	482212614585	100nF 10% 50V
2464	532212232531	100pF 5% 50V
2470	482212233575	220pF 5% 63V
2471	482212614585	100nF 10% 50V
2478	482212233575	220pF 5% 63V
2479	482212614585	100nF 10% 50V
2691	532212232654	22nF 10% 63V
2692	532212232654	22nF 10% 63V

RESISTORS

3400	482205110102	1k 2% 0,25W
3401	482205110102	1k 2% 0,25W
3402	482205110102	1k 2% 0,25W
3403	482205110102	1k 2% 0,25W
3404	482205110102	1k 2% 0,25W
3405	482205110102	1k 2% 0,25W
3406	482205110102	1k 2% 0,25W
3407	482205110102	1k 2% 0,25W
3408	482205120471	470R 5% 0,1W
3409	482205120471	470R 5% 0,1W
3410	482205120471	470R 5% 0,1W
3411	482205120471	470R 5% 0,1W
3412	482205120471	470R 5% 0,1W
3413	482205120471	470R 5% 0,1W
3414	482205110102	1k 2% 0,25W
3415	482205110102	1k 2% 0,25W
3416	482205110102	1k 2% 0,25W
3417	482205110102	1k 2% 0,25W
3418	482205110102	1k 2% 0,25W
3419	482205110102	1k 2% 0,25W
3420	482205110102	1k 2% 0,25W
3421	482205120471	470R 5% 0,1W
3422	482205120101	100R 5% 0,1W
3423	482205120101	100R 5% 0,1W
3424	482205120101	100R 5% 0,1W
3425	482205120101	100R 5% 0,1W
3426	482205120101	100R 5% 0,1W
3427	482205120101	100R 5% 0,1W
3428	482205120101	100R 5% 0,1W
3429	482205120101	100R 5% 0,1W
3430	482205120101	100R 5% 0,1W
3431	482205120101	100R 5% 0,1W
3432	482205120101	100R 5% 0,1W
3433	482205120101	100R 5% 0,1W
3434	482205120101	100R 5% 0,1W
3435	482205120101	100R 5% 0,1W
3436	482205120101	100R 5% 0,1W
3437	482205120101	100R 5% 0,1W
3438	482205120101	100R 5% 0,1W
3439	482205120101	100R 5% 0,1W
3440	482205120101	100R 5% 0,1W
3441	482205120101	100R 5% 0,1W
3442	482205120101	100R 5% 0,1W
3443	482205120101	100R 5% 0,1W
3444	482205120101	100R 5% 0,1W
3445	482205120101	100R 5% 0,1W
3446	482205120101	100R 5% 0,1W
3447	482205120101	100R 5% 0,1W
3448	482205120101	100R 5% 0,1W
3449	482205120101	100R 5% 0,1W
3450	482205120101	100R 5% 0,1W
3451	482205120101	100R 5% 0,1W
3452	482205120101	100R 5% 0,1W
3453	482205120101	100R 5% 0,1W
3454	482205110102	1k 2% 0,25W
3455	482205110102	1k 2% 0,25W
3456	482205110102	1k 2% 0,25W
3459	482205110102	1k 2% 0,25W
3460	482205110102	1k 2% 0,25W
3461	482205110102	1k 2% 0,25W
3462	482205110102	1k 2% 0,25W
3463	482205110102	1k 2% 0,25W
3464	482205110102	1k 2% 0,25W
3465	482205110102	1k 2% 0,25W
3466	482205120471	470R 5% 0,1W
3467	482205120471	470R 5% 0,1W
3468	482205120105	1M 5% 0,1W
3469	482211710833	10k 1% 0,1W
3470	482211710833	10k 1% 0,1W
3472	482211710833	10k 1% 0,1W
3473	482211710833	10k 1% 0,1W
3474	482211710833	10k 1% 0,1W
3475	482211710833	10k 1% 0,1W
3476	482211710833	10k 1% 0,1W
3477	482211710833	10k 1% 0,1W
3479	482205110102	1k 2% 0,25W
3480	482205110102	1k 2% 0,25W
3481	482205120471	470R 5% 0,1W
3482	482205110102	1k 2% 0,25W
3483	482205120471	470R 5% 0,1W
3487	482211713579	220k 1% 0,1W
3488	482211711449	2k2 1% 0,1W
3489	482211710833	10k 1% 0,1W
3490	482211710833	10k 1% 0,1W
3491	482211710833	10k 1% 0,1W
3492	482211710833	10k 1% 0,1W
3495	482205011002	1k 1% 0,4W
3496	482205011002	1k 1% 0,4W
3497	482205120479	47R 5% 0,1W
3498	482211710833	10k 1% 0,1W
3499	482205011002	1k 1% 0,4W
3500	482205110102	1k 2% 0,25W
3501	482211710837	100k 1% 0,1W
3502	482205120479	47R 5% 0,1W
3503	482205120471	470R 5% 0,1W
3504	482205120471	470R 5% 0,1W
3505	482205120471	470R 5% 0,1W
3506	482205120471	470R 5% 0,1W
3507	482205120471	470R 5% 0,1W
3508	482205120471	470R 5% 0,1W
3509	482211711503	220R 1% 0,1W
3510	482211711503	220R 1% 0,1W
3511	482211652298	680k 5% 0,5W
3512	482211652219	330R 5% 0,5W
3513	482211652219	330R 5% 0,5W
3515	482211683868	150R 5% 0,5W
3516	482211683876	270R 5% 0,5W
3517	482211683876	270R 5% 0,5W
3518	482211683876	270R 5% 0,5W
3519	482211683876	270R 5% 0,5W
3520	482211683876	270R 5% 0,5W
3521	482211711504	270R 1% 0,1W
3522	482211683868	150R 5% 0,5W
3524	482211710833	10k 1% 0,1W
3525	482211710833	10k 1% 0,1W
3527	482205120471	470R 5% 0,1W
3534	482211652219	330R 5% 0,5W

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

3535	482211713577	330R 1% 1,25W
3536	482211713577	330R 1% 1,25W
3538	482211713577	330R 1% 1,25W
3539	482211713577	330R 1% 1,25W
3540	482211713577	330R 1% 1,25W
3541	482211713577	330R 1% 1,25W
3544	482205120474	470k 5% 0,1W
3545	482205120474	470k 5% 0,1W
3546	482205120474	470k 5% 0,1W
3548	482211711139	1k5 1% 0,1W
3549	482205120684	680k 5% 0,1W
3550	482211710834	47k 1% 0,1W
3551	482205120474	470k 5% 0,1W
3552	482211711139	1k5 1% 0,1W
3553	482205120684	680k 5% 0,1W
3554	482211710834	47k 1% 0,1W
3555	482205120474	470k 5% 0,1W
3556	482211711139	1k5 1% 0,1W
3557	482205120684	680k 5% 0,1W
3558	482211710834	47k 1% 0,1W
3559	482205120474	470k 5% 0,1W
3571	482211711149	82k 1% 0,1W
3572	482211711149	82k 1% 0,1W
3573	482211711149	82k 1% 0,1W
3574	482211711149	82k 1% 0,1W
3575	482211711149	82k 1% 0,1W
3576	482205110102	1k 2% 0,25W
3577	482205110102	1k 2% 0,25W
3579	482205110102	1k 2% 0,25W
3580	482211710833	10k 1% 0,1W
3581	482211710833	10k 1% 0,1W
3582	482211710833	10k 1% 0,1W
3583	482211710833	10k 1% 0,1W
3586	482205120105	1M 5% 0,1W
3591	482211710833	10k 1% 0,1W
3593	482205120471	470R 5% 0,1W
3595	482211710833	10k 1% 0,1W
3596	482211710833	10k 1% 0,1W
3601	482211713577	330R 1% 1,25W
3602	482211713577	330R 1% 1,25W
3603	482211713577	330R 1% 1,25W
4000	482205120008	0R Jumper 0805
4411	482205120008	0R Jumper 0805
4412	482205120008	0R Jumper 0805
4479	482205120008	0R Jumper 0805

COILS & FILTERS

5400	482215762552	Coil 2,2µH 5%
5401	482215762552	Coil 2,2µH 5%
5402	482215711231	Coil 1µH 5%
5531	482215621721	Coil 2,2µH 10%
5532	482215621721	Coil 2,2µH 10%

DIODES

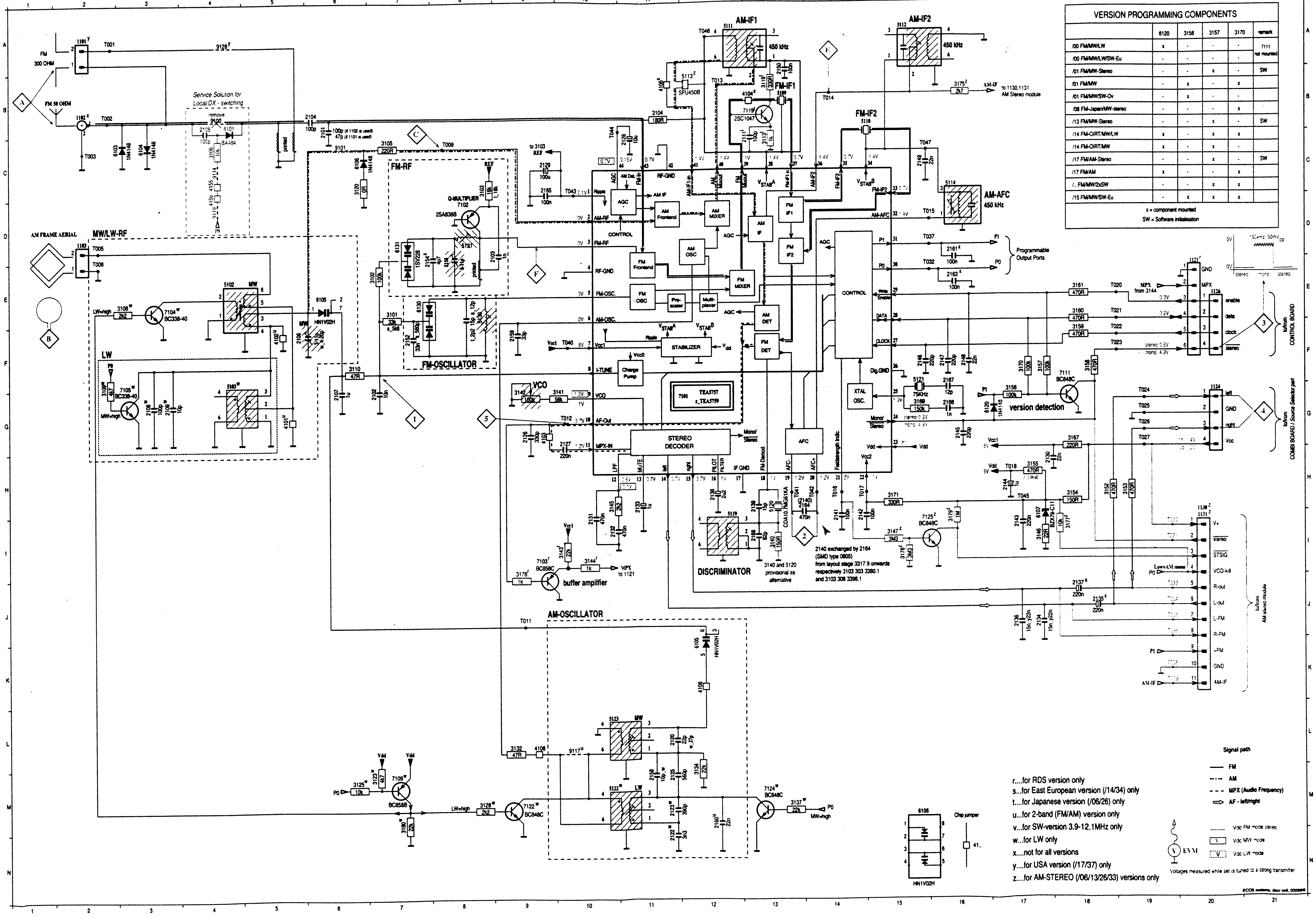
6400	482213031878	1N4003G
6401	482213082978	LTL-1CHPE
6402	482213082978	LTL-1CHPE
6403	482213082978	LTL-1CHPE
6404	482213082978	LTL-1CHPE
6405	482213082978	LTL-1CHPE
6406	482213082978	LTL-1CHPE
6407	482213082978	LTL-1CHPE
6410	482213083119	LTL-307C
6411	482213083119	LTL-307C
6461	482213030621	1N4148
6462	482213030621	1N4148
6463	482213030621	1N4148
6464	482213030621	1N4148
6465	482213030621	1N4148
6466	482213030621	1N4148
6467	482213030621	1N4148
6468	482213030621	1N4148
6469	482213030621	1N4148
6470	482213030621	1N4148
6471	482213030621	1N4148
6472	482213030621	1N4148
6473	482213030621	1N4148
6474	482213030621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7400	310330884081	TMP87CS71F - 'MZ7S84081'
7402	482220931508	ST24C01B6
7403	482220931981	SAA6579T
7404	482213010165	GP1U28XP
7405	482220915449	74HC4094D
7406	482220915449	74HC4094D
7421	482213060511	BC847B
7422	482213060511	BC847B
7423	482213060511	BC847B
7424	482213060511	BC847B
7425	482213060511	BC847B
7427	482213060511	BC847B

Note : Only the parts mentioned in this list are normal service spare parts.

TUNER BOARD ECO5 / Systems


AM-IF1
AM-IF2
FM-IF1
FM-IF2
AM-AFC
450 kHz
FM-RF
FM-OSCILLATOR
MW/LW-RF
LW
MW
VCO
AM-OSCILLATOR
DISCRIMINATOR
AM FRAME AERIAL
FM 300 OHM
FM 50 OHM
Service Solution for Local/DX - switching
Q-MULTIPLIER
CONTROL
STABILIZER
STEREO DECODER
AGC
AM Frontend
AM MIXER
AM IF
AM OSC
FM Frontend
FM OSC
Pre-scaler
Multi-plexer
FM MIXER
FM IF1
FM IF2
AM DET
FM DET
AFC
XTAL OSC.
Charge Pump
7101 TEA5757 z_TEA5759
Programmable Output Ports
buffer amplifier
version detection
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM stereo module
to 1130,1131 AM Stereo module
MPX to 1121
3140 and 5120 provisional as alternative
ECO5 systems, diagr coll, 030898

2140 exchanged by 2164
(SMD type 0805)
from layout stage 3317.9 onwards
respectively 3103 303 3380.1
and 3103 308 3396.1

VERSION PROGRAMMING COMPONENTS

	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/14 FM-OIRT/MW	x	-	x	-	
/17 FM/AM-Stereo	-	-	x	-	SW
/17 FM/AM	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

x = component mounted
SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

Signal path

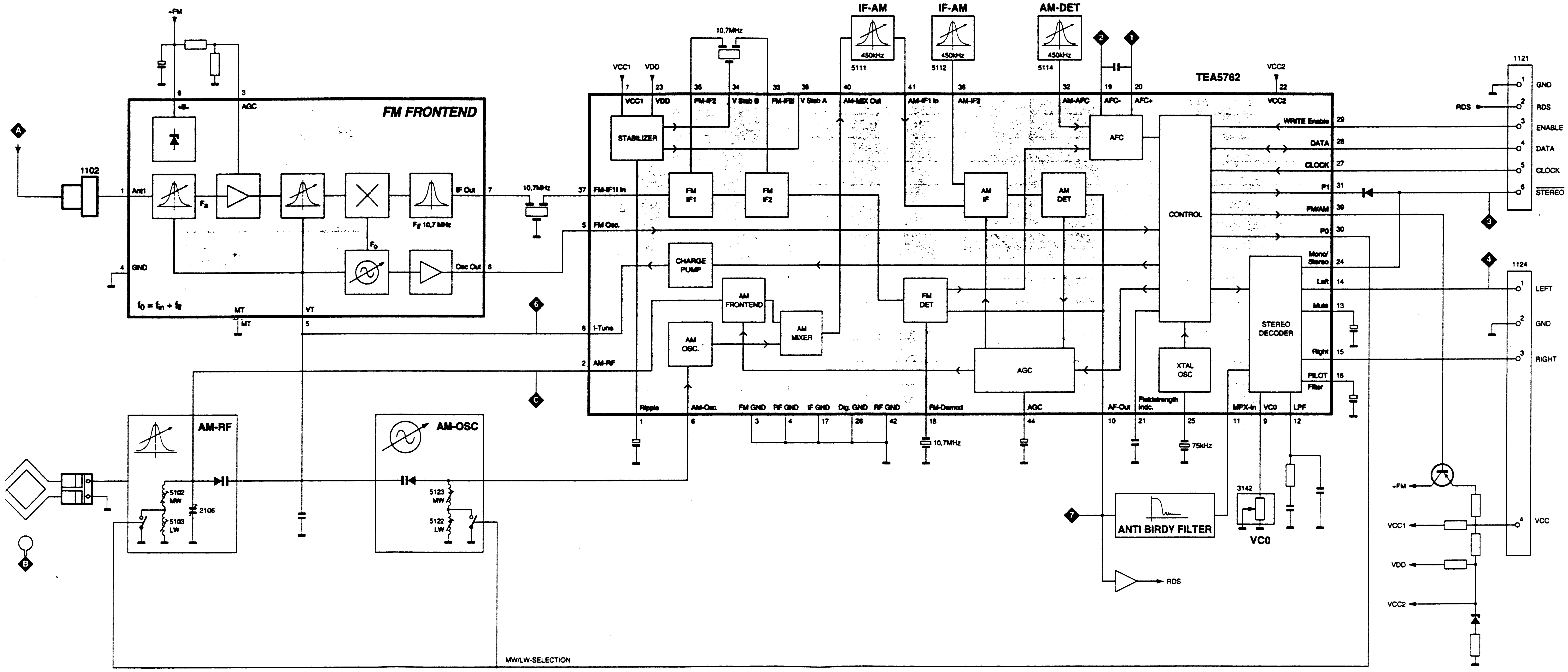
— FM
-·- AM
- - - MPX (Audio Frequency)
⇨ AF - left/right

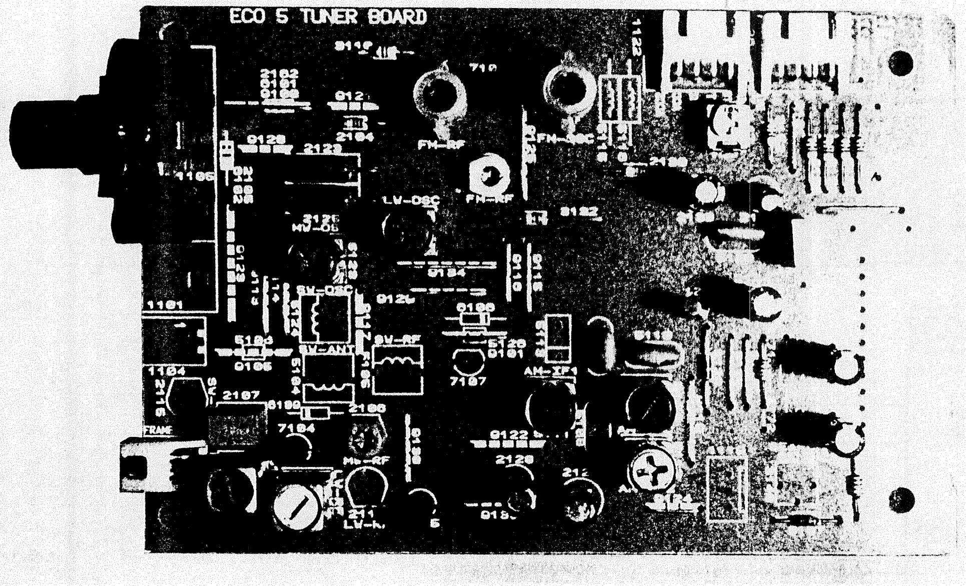
EVM

Vdc FM mode stereo
Vdc MW mode
Vdc LW mode

Voltages measured while set is tuned to a strong transmitter

BLOCKDIAGRAM


+FM
6
3
+B-
AGC
FM FRONTEND
A
1102
1 Ant1
Fa
IF Out
7
F_{if} 10,7 MHz
Fo
4 GND
Osc Out
8
$f_0 = f_{in} + f_{if}$
MT
VT
MT
5
10,7MHz
37 FM-IF1I In
5 FM Osc.
8 I-Tune
2 AM-RF
6
C
10,7MHz
IF-AM
450kHz
5111
IF-AM
450kHz
5112
AM-DET
450kHz
5114
2
1
TEA5762
VCC1
VDD
VCC2
7
23
35
34
33
38
40
41
36
32
19
20
22
VCC1
VDD
FM-IF2
V Stab B
FM-IFB
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
STABILIZER
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
WRITE Enable 29
DATA 28
CLOCK 27
P1 31
FM/AM 39
P0 30
Mono/ Stereo 24
Left 14
Mute 13
Right 15
PILOT Filter 16
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VC0
LPF
1
6
3
4
17
26
42
18
44
10
21
25
11
9
12
10,7MHz
75kHz
1121
1 GND
2 RDS
3 ENABLE
4 DATA
5 CLOCK
6 $\overline{\text{STEREO}}$
RDS
3
4
1124
1 LEFT
2 GND
3 RIGHT
4 VCC
+FM
VCC1
VDD
VCC2
AM-RF
5102 MW
5103 LW
2106
B
AM-OSC
5123 MW
5122 LW
7
ANTI BIRDY FILTER
3142
VC0
RDS
MW/LW-SELECTION


ECO 5 TUNER BOARD
FM-RF
FM-OSC
LW-OSC
MW-OS
SW-OSC
SW-ANT
SW-RF
AM-IF1
MW-RF
LW-RF
FRAME

TUNER BOARD ECO5

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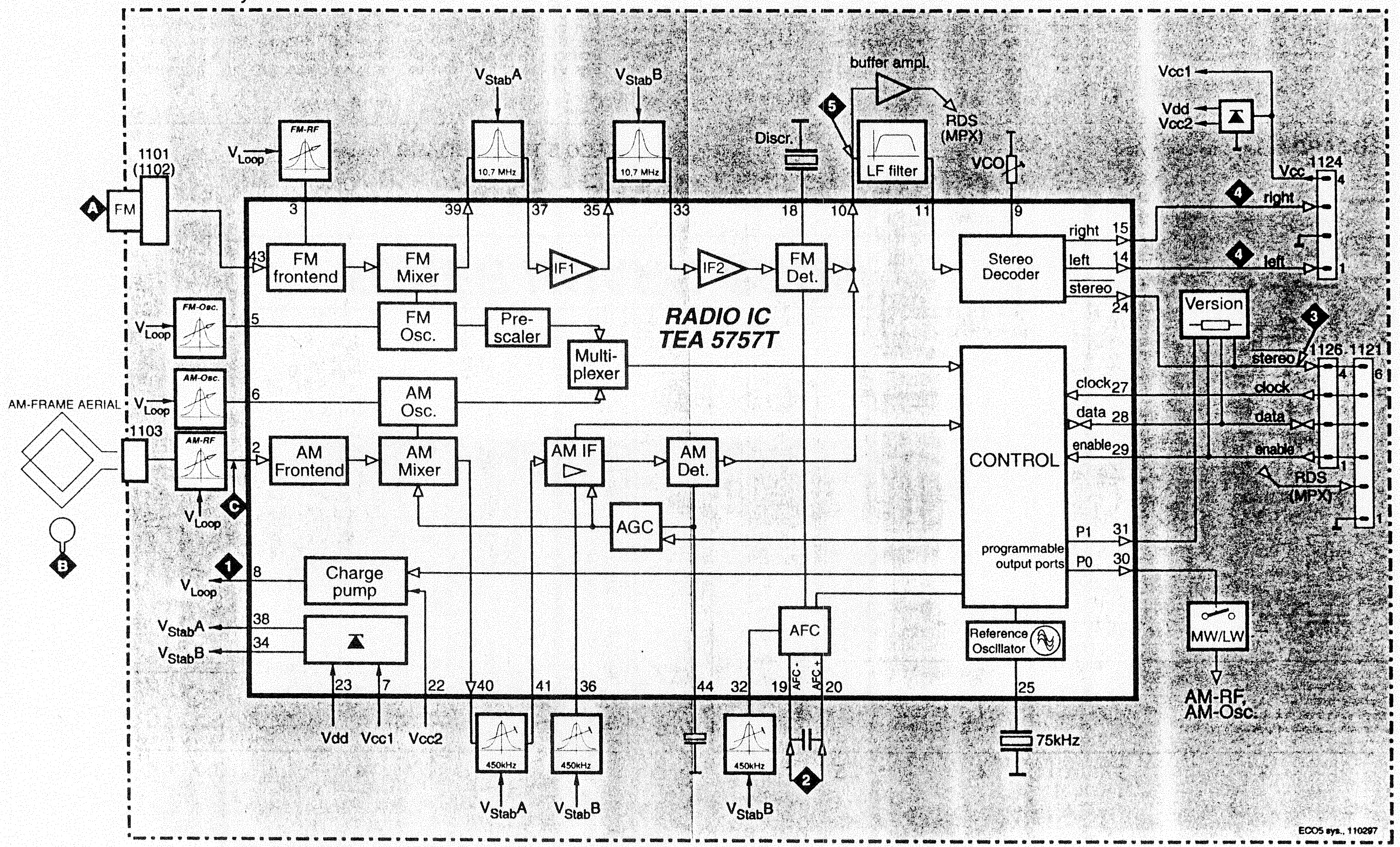
BLOCKDIAGRAM

TUNER BOARD
ECO 5 systems



RADIO IC
TEA 5757T
FM
1101
(1102)
V Loop
FM-RF
V Stab A
10,7 MHz
V Stab B
10,7 MHz
buffer ampl.
RDS
(MPX)
Discr.
LF filter
VCO
Vcc1
Vdd
Vcc2
Vcc
1124
right
left
FM frontend
FM Mixer
IF1
IF2
FM Det.
Stereo Decoder
FM Osc.
Pre-scaler
Multi-plexer
FM-Osc.
AM-Osc.
AM-RF
AM-FRAME AERIAL
1103
AM Osc.
AM Frontend
AM Mixer
AM IF
AM Det.
AGC
CONTROL
clock
data
enable
stereo
Version
1126
1121
programmable output ports
P1
P0
Charge pump
V Stab A
V Stab B
Vdd
Vcc1
Vcc2
AFC
AFC-
AFC+
Reference Oscillator
75kHz
450kHz
MW/LW
AM-RF,
AM-Osc.
A
B
C
1
2
3
4
5
3
39
37
35
33
18
10
11
9
43
5
6
2
8
38
34
23
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40
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44
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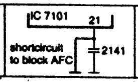
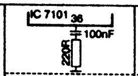
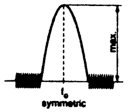
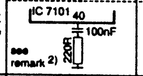
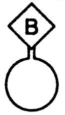
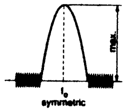
31
30
ECO5 sys., 110297

TUNER ADJUSTMENT TABLE (ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	◇1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	◇F		5119	◇2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	◇A	108MHz	2155	◇4	MAX ↕
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	◇A	98MHz	3142	◇3	152kHz ±1kHz [1]
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	◇C Δf=±15kHz V_{RF} = 3mV		5111	◇4	
			 see remark 2)	5112		
AM AFC **MW**		◇C continuous wave V_{RF} = 10mV		5114	◇2	0 ± 2 mV DC
AM RF [3]						
MW [4] FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz		1494kHz	2106	◇4	 ↕
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	Δf = ±30kHz V_{RF} as low as possible	1500kHz	2106		↕
	560kHz		560kHz	5102		

ECO5 descr. coll. 080797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

[2] RC network serves for damping the IF-filter while adjusting the other one.

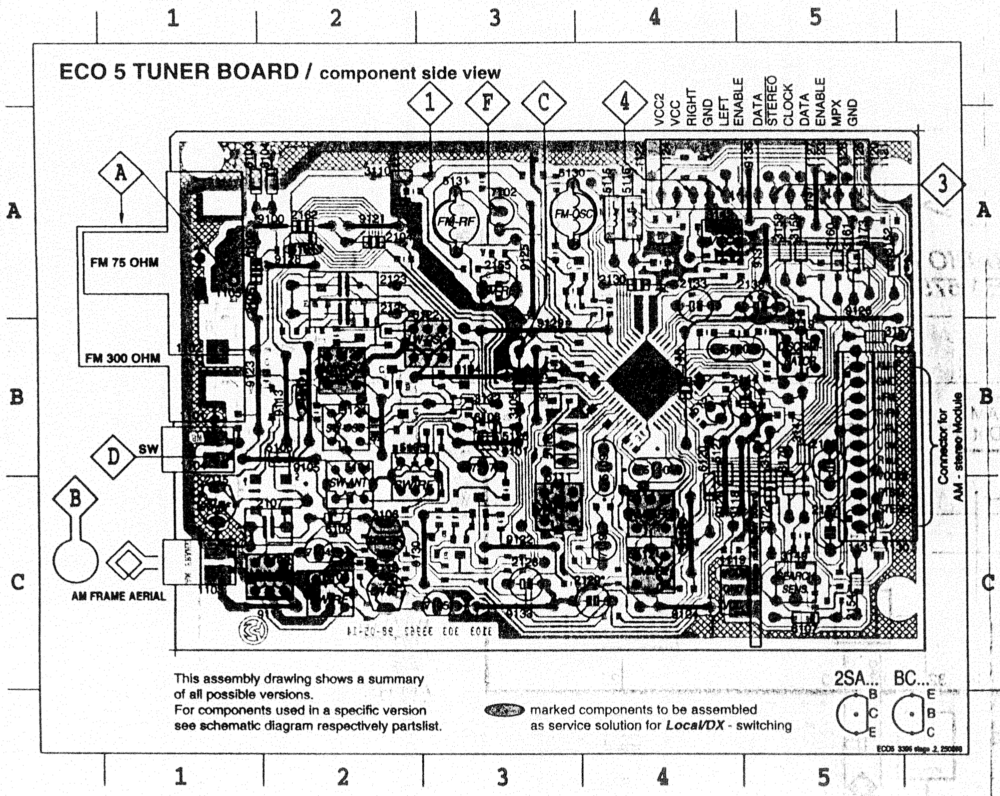
[3] For AM RF adjustments the original frame antenna has to be used !

[4] MW has to be aligned before LW.

↕ Repeat

1101	A1
1102	A1
1103	C1
1104	B1
1105	A1
1119	C5
1120	A5
1130	B5
1131	B5
2104	A2
2105	A1
2106	C2
2107	C2
2110	C2
2115	C1
2123	A2
2125	A2
2128	C3
2129	C4
2130	A4
2133	A4
2135	B5
2137	C5
2138	A5
2144	B5
2148	B4
2155	A3
2162	A2
3105	B3
3110	A2
3132	B3
3142	A4
3147	B5
3149	C5
3152	A5
3154	C5
3157	B5
3158	A5
3159	A5
3160	A5
3161	A5
3170	C5
3171	C5
3172	C5
3173	A5
5102	C2
5103	C2
5104	C2
5105	B2
5106	B2
5109	B4
5110	B4
5111	C3
5112	C4
5113	B3
5114	C4
5115	A4
5116	A4
5119	B5
5120	B4
5121	B4
5122	B3
5123	B2
5124	B2
5126	B3
5127	B4
5130	A3
5131	A3
6101	A2
6102	A1
6103	A1
6104	A2
6106	B3
6107	C5
6109	C2
6120	C4
7102	A3
7104	C2
7105	C3
7107	B3
7119	C4
9100	A2
9101	B3
9105	B2
9111	C2
9113	B2
9114	B2
9115	B3
9117	B2
9118	B4
9119	C4
9120	B4
9121	A2
9122	C3
9123	B1
9124	C4
9125	A3
9126	B5
9128	A2
9129	B3
9130	C3
9131	A5
9133	C3
9134	B3
9136	A5
9137	A5

ECO 5 TUNER BOARD / component side view

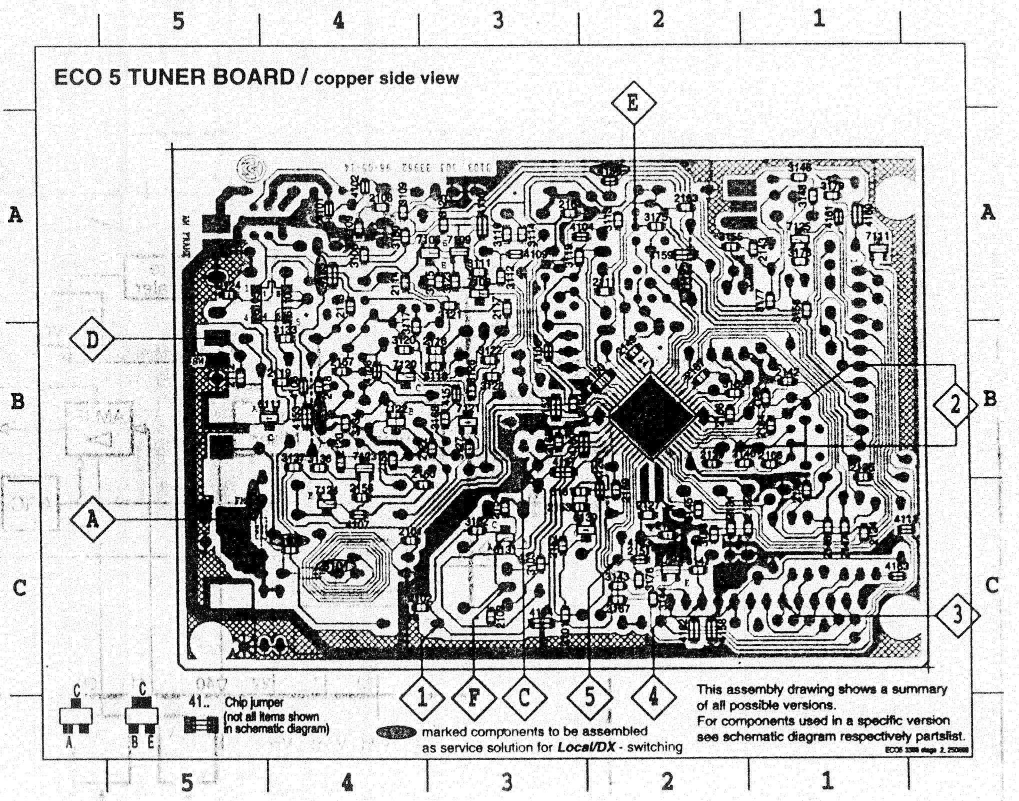


This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

2101	C4
2102	C4
2103	C3
2108	A4
2109	A4
2111	A2
2112	B5
2113	A4
2114	A4
2116	B3
2117	A3
2118	B4
2119	B4
2120	B4
2122	B3
2124	A5
2126	C2
2127	C2
2131	C2
2132	C1
2134	C1
2136	B1
2139	B2
2141	B1
2142	B1
2143	A1
2145	C1
2146	C1
2147	C1
2149	B2
2150	B2
2151	C2
2152	C3
2153	C3
2154	C3
2156	C4
2157	B4
2158	B4
2159	C2
2160	C4
2161	A3
2163	A2
2164	B1
2165	B3
2166	B2
2167	B2
2168	B1
3101	C3
3102	C3
3103	C3
3104	B3
3106	C4
3108	A4
3109	A4
3111	A3
3112	A3
3113	A2
3114	A3
3115	A3
3116	A3
3117	B4
3118	B3
3119	A3
3120	B4
3121	A3
3122	B3
3123	A3
3125	A3
3126	B3
3127	B3
3128	B3
3133	B4
3134	B4
3136	B4
3137	B4
3140	B2
3141	C2
3143	C2
3144	C2
3145	C2
3146	A1
3148	A1
3153	C2
3155	A2
3156	A1
3167	C2
3168	B3
3169	B2
3175	A2
3176	C2
3177	A1
3178	A1
3179	A1
3180	A4
3181	C3
4101	A4
4102	A4
4103	C2
4104	A2
4105	B3
4106	B4
4107	C4
4108	B4
4109	A3
4110	A3
4111	C1
4120	C2
4150	B2
4151	B3
4152	B3
4153	B4
4154	C3
4155	A4
4156	A2
4157	B3
4158	C2
4159	A2
4160	A1
4161	A1
4162	C1
4163	C1
6105	A4
6110	A4
6111	B4
6130	C2
6131	C3
7101	B2
7103	C2
7106	A3
7108	A3
7109	A3
7111	A1
7120	B4
7121	B3
7122	B4
7123	B4
7124	C4
7125	A1

ECO 5 TUNER BOARD / copper side view

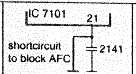
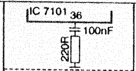
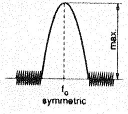
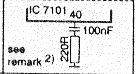
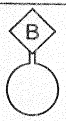
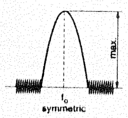


Chip jumper (not all items shown in schematic diagram)

marked components to be assembled as service solution for ***Local/DX*** - switching

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

TUNER ADJUSTMENT TABLE (ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	◇ 1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	◇ F		5119	◇ 2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	◇ A mod=1kHz Δf=±22.5kHz	108MHz	2155	◇ 4	MAX ↕
	87.5MHz (65.81MHz)		87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	◇ A	98MHz	3142	◇ 3	152kHz ±1kHz [1]
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	◇ C $\Delta f = \pm 15kHz$ $V_{RF} = 3mV$		5111	◇ 4	
				5112		
AM AFC **MW**		◇ C continuous wave $V_{RF} = 10mV$		5114	◇ 2	0 ± 2 mV DC
AM RF [3]						
MW [4] FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	 $\Delta f = \pm 30kHz$ V_{RF} as low as possible	1494kHz	2106	◇ 4	 ↕
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		↕
	560kHz		560kHz	5102		

ECO5 discr. coil, 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

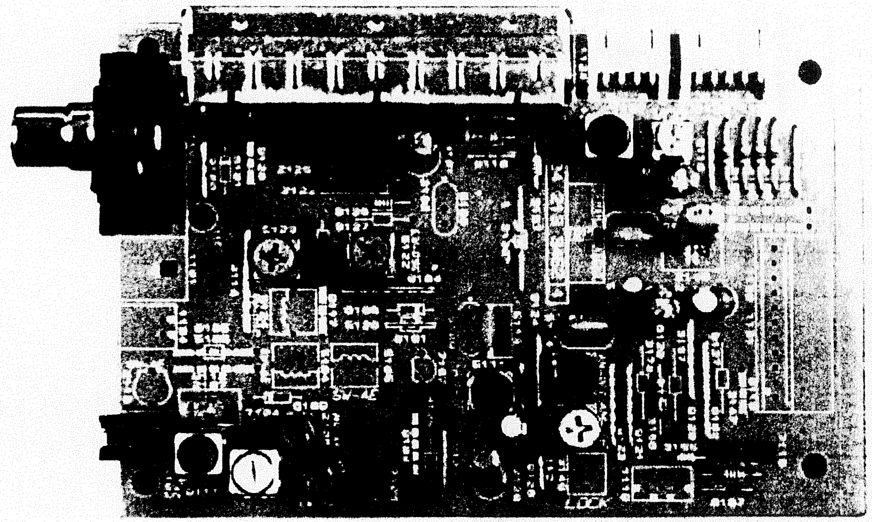
[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

[2] RC network serves for damping the IF-filter while adjusting the other one.

[3] For AM RF adjustments the original frame antenna has to be used !

[4] MW has to be aligned before LW.

↕ Repeat



TUNER 95 BOARD

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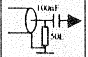
Adjustmant table 7D-2
Component layout 7D-2
Circuit diagram 7D-3
Partslist 7D-4

TUNER 95 bis Adjustment Table (FM, MW, LW with Frame antenna)

Waverange	Input frequency	Input	Set tuned to	Adjust	Output	Scope / Voltmeter
VARICAP ALIGNMENT						
FM (50)			108 MHz	check	◇6	7 ... 9V
87.5 - 108 MHz			87.5 MHz	check		1.3 ... 2V
MW (9)			1602 kHz	5123		8.3V ± 0.2V
531 - 1602 kHz			531 kHz	check		1V ± 0.4V
LW (3)			279 kHz	5122		8.3V ± 0.2V
153 - 279 kHz			153 kHz	check		1V ± 0.4V
FM – DETECTION						
FM	98 MHz 1mV continuous wave *short pin 21 (IC7101) to ground*	◇A	98 MHz	5107	◇1 ◇2	0mV ± 3mV
FM – VCO						
FM	98 MHz, 1 mV continuous wave	◇A	98 MHz	3142	◇3	152kHz ± 1 kHz
DISTORTION						
FM	98 MHz 1 mV 90 % L + 9 % pilot mod = 1kHz	◇A	98MHz	mixcoil inside Tuner 1110	◇4	Distortion minimum
AM – IF						
MW	450kHz Δf = 10kHz Low as possible Swept signal		MW	5111 5112	◇7	symmetrical and max. height ↕
	450kHz continuous wave	◇C		5114	◇1 ◇2	0mV ± 2mV
AM - RF						
MW	558kHz Mod = 1kHz 30 % AM 1494 kHz	◇B	558kHz 1494kHz	5102 2106	◇7	MAX ↕
LW	198kHz mod = 1kHz 30 % AM	*	198kHz	5103		MAX

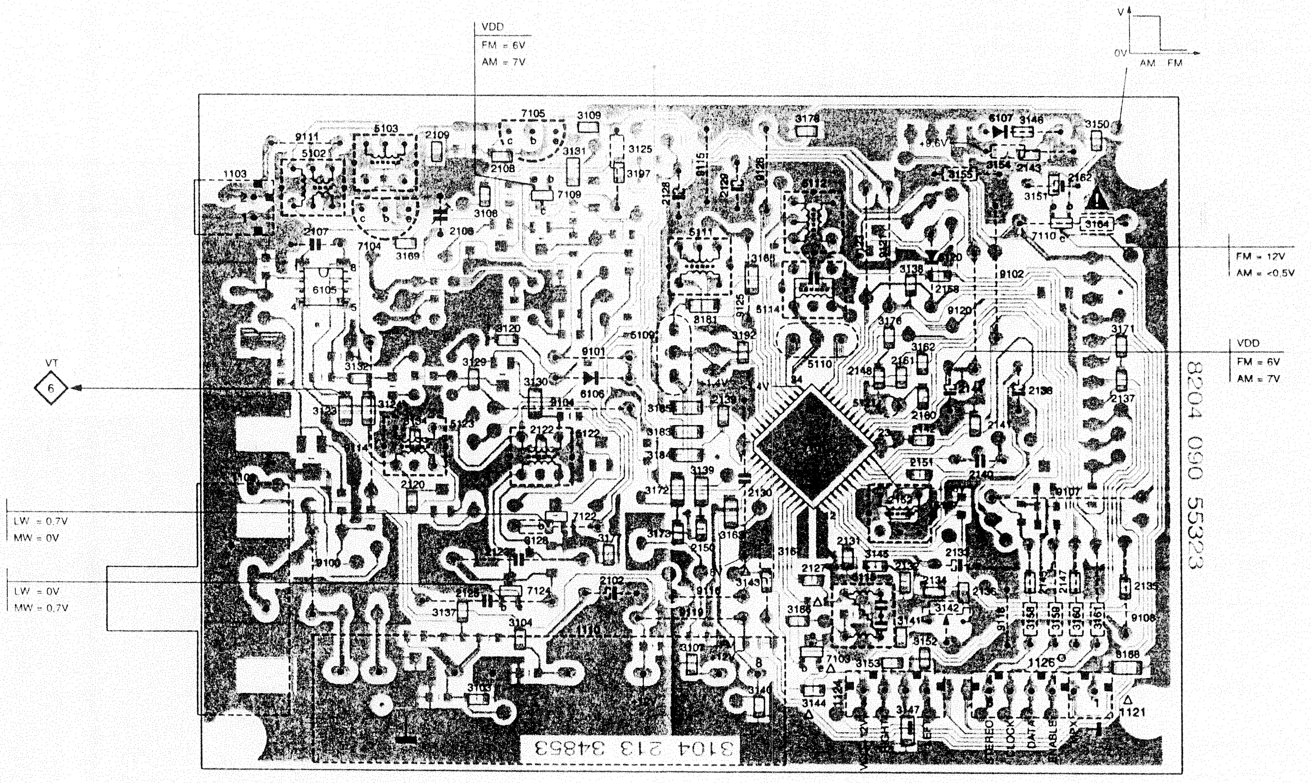
adjtable for 3104 217 04121/04341

* Signal send via a frame antenna
(..) = tuning grid in kHz

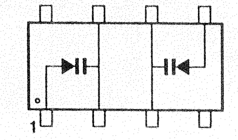
↕ repeat

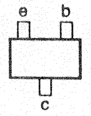
1102	F4	2107	C4	2128	C7	2136	G10	2144	E10	2160	E9	3120	D6	3132	E5	3143	G8	3153	G9	3163	F8	3176	D9	3188	G11	5111	C8	6106	E7	7110	D11	9108	G11	9121	D9
1103	C4	2108	C6	2129	C8	2137	E11	2145	G11	2161	E9	3123	E4	3134	E5	3144	H9	3154	C10	3164	C11	3177	F7	3192	D8	5112	C9	6107	B10	7122	F7	9111	C4	9123	D9
1110	G7	2109	C5	2130	F8	2138	E10	2147	G11	2162	C11	3124	E5	3137	G5	3145	F9	3155	C10	3165	D8	3178	B8	3197	C7	5114	D8	6120	D10	7124	G6	9114	E5	9125	D8
1121	H11	2120	F5	2131	F9	2139	E8	2148	E9	3103	H6	3125	C7	3138	D9	3146	B10	3158	G11	3167	F8	3181	D8	5102	C4	5115	G9	7101	E9	9100	F4	9115	C8	9126	C8
1124	H9	2122	E6	2132	F9	2140	F10	2150	F8	3104	G6	3128	F6	3139	F8	3147	H9	3159	G11	3169	D5	3183	E7	5103	C5	6121	E9	7103	G9	9101	E7	9116	G8		
1126	G10	2123	F6	2133	F10	2141	E10	2151	F9	3107	G7	3129	E6	3140	H8	3150	C11	3160	G11	3171	D11	3184	E7	5107	F10	5122	E7	7104	D5	9102	D10	9118	G10		
2102	G7	2125	G6	2134	G10	2142	E9	2152	F9	3108	C6	3130	E6	3141	G9	3151	C10	3161	G11	3172	F7	3185	E7	5109	D7	5123	E5	7105	B6	9104	E6	9119	G7		
2106	C5	2127	F9	2135	G11	2143	C10	2158	D10	3109	B7	3131	C6	3142	G10	3152	G9	3162	D9	3173	F7	3186	G8	5110	E9	6105	D4	7109	C6	9107	F11	9120	D10		

TUNER 95 bis Combi: Copper side view


VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0.5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0.7V
MW = 0V
LW = 0V
MW = 0.7V
8204 090 55323
3104 213 34853
1103
9111
5102
5103
2109
7105
3109
3131
3125
3197
2108
7109
3108
2106
2107
7104
3169
6105
3120
3129
3130
3104
6106
9101
6109
3178
6107
3146
3150
3154
2143
2162
3151
3164
7110
3155
3138
2158
9102
9120
3176
3162
2161
3171
2136
2137
5110
5114
8181
3192
3139
3172
3173
2120
2122
6122
7122
3128
9100
2125
7124
2102
3137
3104
3103
1110
2131
3145
2127
3143
3166
2133
2134
2135
3142
3152
3153
3144
3147
1126
3188
9108
1121
STEREO
LOCK
DATA
ENABLE

IC 6105





△ only in RDS version (04121)

○ not in RDS version (04341)

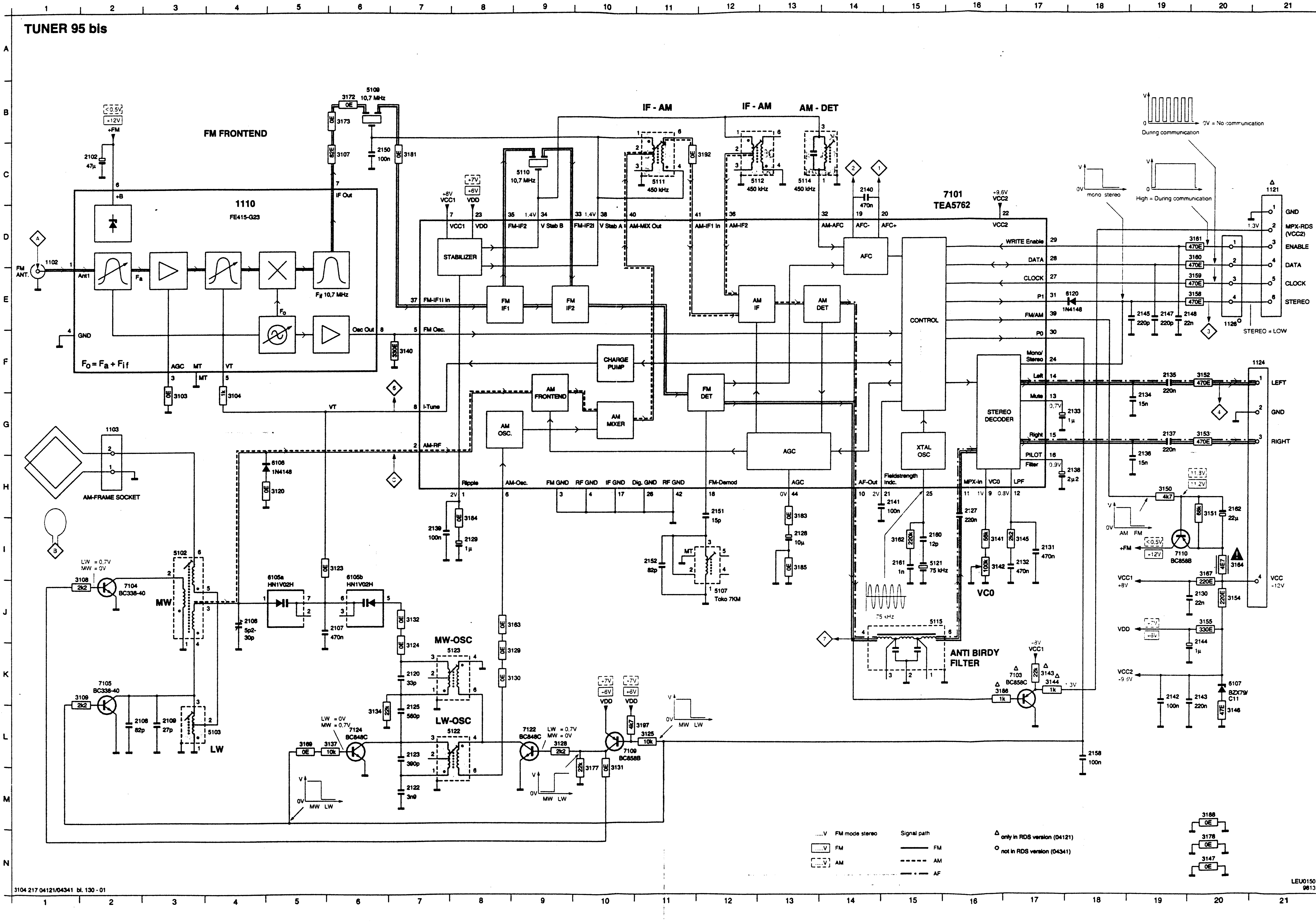
TUNER 95 bis
3104 217 04121/04341 bl. 110 - 01

LEU0149
9813

1102	D1	1124	F21	2107	J6	2122	M7	2128	I13	2132	I17	2136	H19	2140	C14	2144	K20	2150	C6	2160	I15	3104	G4	3120	H5	3128	L9	3132	J7
1103	G2	1126	E20	2108	L2	2123	L7	2129	I8	2133	G18	2137	G19	2141	H15	2145	E19	2151	H12	2161	I15	3107	C6	3123	I6	3129	K8	3134	L6
1110	D4	2102	C2	2109	L3	2125	L7	2130	J20	2134	G19	2138	H18	2142	K19	2147	E19	2152	I11	2162	H20	3108	J1	3124	K7	3130	K8	3137	L5
1121	C21	2106	J4	2120	K7	2127	H16	2131	I17	2135	F19	2139	I7	2143	K20	2148	E19	2158	L18	3103	G3	3109	K1	3125	L11	3131	M10	3140	F7

3141	I16	3145	I17	3151	I20	3155	J20	3161	D19	3167	I20	3177	M10	3184	I8	3192	C12	5107	J12	5112	C12	5122	L7	6106	H5	7103	K17	7110	I19
3142	I16	3146	L20	3152	F20	3158	E19	3162	I15	3169	L5	3178	N20	3185	I13	3197	L11	5109	B6	5114	C13	5123	K7	6107	K20	7104	J2	7122	L9
3143	K17	3147	N20	3153	G20	3159	E19	3163	J8	3172	B6	3181	C7	3186	K16	5102	I3	5110	C9	5115	J15	6105a	I5	6120	E17	7105	K2	7124	L6
3144	K17	3150	H19	3154	J20	3160	D19	3164	I20	3173	B6	3183	I13	3188	M20	5103	L4	5111	C11	5121	I15	6105b	I6	7101	C15	7109	L10		

TUNER 95 bis



FM FRONTEND
1110
FE415-G23
+B
IF Out
Osc Out
GND
AGC
MT
VT
Ant1
Fa
Fo
Fif 10,7 MHz
Fo = Fa + Fif
FM ANT.
1102
+FM
2102 47µ
<0.5V
+12V
3172 0E
5109 10,7 MHz
3173 0E
3107 82E
2150 100n
3181 0E
3140 330E
3103 0E
3104 1k
1103
AM-FRAME SOCKET
IF - AM
IF - AM
AM - DET
5110 10,7 MHz
5111 450 kHz
5112 450 kHz
5114 450 kHz
3192 0E
2140 470n
7101
TEA5762
VCC1
VDD
+8V
+7V
+6V
+9.6V VCC2
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
STABILIZER
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
FM DET
AM OSC.
AGC
XTAL OSC
STEREO DECODER
FM-IF1 In
FM Osc.
I-Tune
AM-RF
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/Stereo
Left
Mute
Right
PILOT
Filter
6120 1N4148
2145 220p
2147 220p
2148 22n
1121
GND
MPX-RDS (VCC2)
ENABLE
DATA
CLOCK
STEREO
3161 470E
3160 470E
3159 470E
3158 470E
1126
STEREO = LOW
0V = No communication
During communication
High = During communication
mono stereo
1124
LEFT
GND
RIGHT
2135 220n
3152 470E
2134 15n
2133 1µ
2137 220n
3153 470E
2136 15n
2138 2µ2
3150 4k7
11.3V
11.2V
3151 68k
2162 22µ
7110 BC858B
+FM
<0.5V
+12V
AM FM
3164 4E7
VCC1 +8V
3167 220E
2130 22n
3154 220E
VCC -12V
VDD
+7V
+6V
3155 330E
2144 1µ
VCC2 -9.6V
2142 100n
2143 220n
6107 BZX79/C11
3146 47E
2158 100n
7103 BC858C
3186 1k
3143 22k
3144 1k
3V
6106 1N4148
3120 0E
2139 100n
3184 0E
2129 1µ
2151 15p
2152 82p
5107 Toko 7KM
MT
3183 0E
2128 10µ
3185 0E
2141 100n
2127 220n
3162 220k
2160 12p
2161 1n
5121 75 kHz
3141 56k
3145 2k2
3142 100k
2132 470n
2131 470n
VCO
75 kHz
5115
ANTI BIRDY FILTER
3108 2k2
7104 BC338-40
LW = 0.7V MW = 0V
MW
5102
2106 5p2-30p
6105a HN1V02H
6105b HN1V02H
3123 0E
2107 470n
3132 0E
3124 0E
MW-OSC
5123
2120 33p
3134 22k
2125 560p
LW-OSC
5122
2123 390p
2122 3n9
3163 0E
3129 0E
3130 0E
7105 BC338-40
3109 2k2
2108 82p
2109 27p
5103
LW
3169 0E
3137 10k
7124 BC848C
LW = 0V MW = 0.7V
7122 BC848C
LW = 0.7V MW = 0V
3128 2k2
3177 22k
3131 0E
7109 BC858B
3197 4k7
3125 10k
MW LW
3188 0E
3178 0E
3147 0E
.....V FM mode stereo
V FM
V AM
Signal path
FM
AM
AF
only in RDS version (04121)
not in RDS version (04341)

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9813

ELECTRICAL PARTS LIST - ECO5 TUNER BOARD

MISCELLANEOUS

1101	4822 267 31505	Antenna Socket 300R	
1102	4822 267 10283	Antenna Socket Coax IEC 75R	

CAPACITORS

2101	5322 122 32531	100pF 5% 50V	
2101	4822 126 13692	47pF 1% 63V	for USA
2102	4822 122 33177	10nF 20% 50V	
2103	5322 122 34123	1nF 10% 50V	
2104	4822 122 33195	100pF 10% 50V	
2106	4822 125 50355	Trimmer 4-20pF	for LW version
2106	4822 125 60101	Trimmer 3-11pF 100V	
2107	4822 121 51319	1µF 10% 63V	
2108	5322 122 32531	100pF 5% 50V	for LW version
2109	5322 122 32448	10pF 5% 50V	for LW version
2120	4822 126 13691	27pF 1% 63V	for LW version
2120	5322 122 32658	22pF 5% 50V	
2122	4822 122 33891	3,3nF 10% 63V	for LW version
2125	4822 121 51381	560pF 5% 400V	
2126	5322 122 31863	330pF 5% 50V	
2127	4822 126 13473	220nF +80/-20% 50V	
2128	4822 124 41579	10µF 20% 50V	
2129	4822 124 41584	100µF 20% 10V	
2130	4822 126 11585	22nF+80/- 20% 25V	
2131	4822 122 33325	470nF 16V	
2132	4822 122 33325	470nF 16V	
2131	4822 126 13482	470nF +80/- 20% 16V	
2132	4822 126 13482	470nF +80/- 20% 16V	
2133	4822 124 40242	1µF 20% 63V	
2134	4822 126 13188	15nF 5% 63V	
2134	5322 122 32654	22nF 10% 63V	for USA
2135	4822 124 40746	0,22µF 20% 63V	
2136	4822 126 13188	15nF 5% 63V	
2136	5322 122 32654	22nF 10% 63V	for USA
2137	4822 124 40746	0,22µF 20% 63V	
2138	4822 124 41576	2,2µF 20% 50V	
2139	4822 126 14236	50V 15pF 5%	
2140	4822 121 51252	470nF 5% 63V	
2141	4822 126 10002	100nF 20% 25V	
2142	4822 126 10002	100nF 20% 25V	
2143	4822 126 13473	220nF +80/-20% 50V	
2144	4822 124 40242	1µF 20% 63V	
2145	4822 122 33575	220pF 5% 50V	
2146	4822 122 33575	220pF 5% 50V	
2147	4822 122 33575	220pF 5% 50V	
2148	4822 126 11585	22nF+80/- 20% 25V	
2149	5322 122 32654	22nF 10% 63V	
2150	4822 122 31947	100nF 20% 63V	
2152	5322 116 80853	560pF 5% 63V	for East. Europe
2152	4822 126 12105	33nF 5% 63V	
2153	4822 122 32139	12pF 2% 63V	for East. Europe
2153	4822 122 32504	15pF 2% 63V	
2155	4822 125 60101	Trimmer 3-11pF 100V	
2158	5322 122 32448	10pF 5% 50V	for LW version
2159	5322 122 32659	33pF 5% 50V	
2160	5322 122 32654	22nF 10% 63V	
2161	4822 126 10002	100nF 20% 25V	
2163	4822 126 10002	100nF 20% 25V	
2164	4822 126 13482	470nF +80/- 20% 16V	
2165	4822 126 10002	100nF 20% 25V	
2166	5322 122 34123	1nF 10% 50V	
2167	4822 122 32139	12pF 2% 63V	
2168	4822 126 13695	82pF 1% 63V	

RESISTORS

3101	4822 051 20562	5k6 5% 0,1W	for East. Europe
3101	4822 051 20333	33k 5% 0,1W	
3102	4822 051 20104	100k 5% 0,1W	
3103	4822 117 10965	18k 1% 0,1W	
3104	4822 117 11448	180R 1% 0,1W	
3105	4822 116 83872	220R 5% 0,5W	
3108	4822 117 11449	2k2 1% 0,1W	for LW version
3109	4822 051 20472	4k7 5% 0,1W	for LW version
3110	4822 116 52195	47R 5% 0,5W	
3120	4822 051 20008	0R Jumper 0805	
3123	4822 051 20472	4k7 5% 0,1W	for LW version
3125	4822 117 10833	10k 1% 0,1W	for LW version
3128	4822 117 11449	2k2 1% 0,1W	for LW version
3132	4822 116 52195	47R 5% 0,5W	
3134	4822 051 20223	22k 5% 0,1W	
3137	4822 051 20223	22k 5% 0,1W	for LW version
3140	4822 051 20008	0R Jumper 0805	
		5120=CDA10.7MG40K	
3140	4822 117 10353	150R 1% 0,1W	
		5120=CDA10.7MG61KA	
3141	4822 051 20563	56k 5% 0,1W	
3142	4822 100 11163	Trimmer 100k 30% 0,1W	
3143	4822 051 20223	22k 5% 0,1W	for RDS version
3144	4822 051 10102	1k 2% 0,25W	for RDS version
3145	4822 117 11449	2k2 1% 0,1W	
3146	4822 051 20229	22R 5% 0,1W	
3152	4822 116 83883	470R 5% 0,5W	
3153	4822 051 20471	470R 5% 0,1W	
3154	4822 116 83868	150R 5% 0,5W	
3155	4822 051 20471	470R 5% 0,1W	
3156	4822 051 20104	100k 5% 0,1W	for /21/30/33 only
3157	4822 116 52234	100k 5% 0,5W	for East. Europe
3158	4822 116 83883	470R 5% 0,5W	
3159	4822 116 83883	470R 5% 0,5W	
3160	4822 116 83883	470R 5% 0,5W	
3161	4822 116 83883	470R 5% 0,5W	
3167	4822 117 11503	220R 1% 0.1W	
3169	4822 051 20154	150k 5% 0,1W	
3170	4822 116 52234	100k 5% 0,5W	
3171	4822 116 52219	330R 5% 0,5W	

3176	4822 051 10102	1k 2% 0,25W	for RDS version
3180	4822 051 20223	22k 5% 0,1W	for LW version
4101	4822 051 20008	0R Jumper 0805	for 2-Band only
4102	4822 051 20008	0R Jumper 0805	for 2-Band only
4103	4822 051 20008	0R Jumper 0805	
4104	4822 051 20008	0R Jumper 0805	
4105	4822 051 20008	0R Jumper 0805	
4106	4822 051 20008	0R Jumper 0805	
4108	4822 051 20008	0R Jumper 0805	
4111	4822 051 20008	0R Jumper 0805	
4120	4822 051 20008	0R Jumper 0805	
4150	4822 051 10008	0R Jumper 1206	
4151	4822 051 20008	0R Jumper 0805	
4152	4822 051 10008	0R Jumper 1206	
4153	4822 051 10008	0R Jumper 1206	
4154	4822 051 10008	0R Jumper 1206	
4155	4822 051 10008	0R Jumper 1206	
4156	4822 051 20008	0R Jumper 0805	
4157	4822 051 10008	0R Jumper 1206	
4158	4822 051 10008	0R Jumper 1206	
4159	4822 051 10008	0R Jumper 1206	
4162	4822 051 10008	0R Jumper 1206	

COILS & FILTERS

5102	4822 157 71634	MW RF Coil	
5103	4822 157 71635	LW RF Coil	for LW version
5109	4822 242 70665	Ceram Filter 10,7MHz	
5110	4822 242 70665	Ceram Filter 10,7MHz	
5111	4822 158 60511	AM-IF Filter 450kHz	
5112	4822 157 70302	AM-IF Filter 450kHz	
5114	4822 157 70302	AM-IF Filter 450kHz	
5119	4822 157 11443	Discriminator 10,7MHz	
5120	4822 242 82065	Cer. Disc. 10,7MG40K	
5120	4822 242 10251	Cer. Disc.10,7MG61KA-TF21	
5121	4822 242 10261	Quartz 75kHz	
5122	4822 157 60517	Osc. Coil LW	for LW version
5123	4822 157 60517	Osc. Coil MW	
5130	4822 156 30947	RF-Coil 1.5T	
5131	4822 156 30947	RF-Coil 1.5T	

DIODES

6103	4822 130 30621	1N4148	
6104	4822 130 30621	1N4148	
6105	4822 130 83075	HN1V02H-B	
6106	4822 130 30621	1N4148	
6107	4822 130 34488	BZX79-B11	
6120	4822 130 30621	1N4148	not for /21/30/33
6130	4822 130 82833	1SV228	
6131	4822 130 82833	1SV228	

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90924	TEA5757H/V1	
7102	4822 130 60093	2SA838B	
7103	4822 130 42513	BC858C	for RDS version
7104	5322 130 44779	BC338-40	for LW version
7105	5322 130 44779	BC338-40	for LW version
7109	5322 130 41983	BC858B	for LW version
7111	5322 130 42136	BC848C	
7122	5322 130 42136	BC848C	for LW version
7124	5322 130 42136	BC848C	for LW version

Note: Only the parts mentioned in this list are normal service spare parts.

ELECTRICAL PARTS LIST - TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	Socket Coaxial IEC 75R
1103	4822 265 31184	JST Connector 2 pin
1110	4822 210 10739	Frontend Assembly FE415-G23

CAPACITORS

2102	4822 124 40433	47µF 20% 25V
2106	4822 125 60102	Trimmer 5,2-30pF 100V
2107	4822 121 51252	470nF 5% 63V
2108	4822 126 13695	82pF 1% 63V
2109	4822 126 13691	27pF 1% 63V
2120	5322 122 32659	33pF 5% 50V
2122	5322 126 10465	3,9nF 10% 50V
2123	4822 121 10766	390pF 1% 630V
2125	4822 121 10578	560pF 1% 630V
2127	4822 122 32927	220nF +80/-20% 50V
2128	4822 124 41579	10µF 20% 50V
2129	4822 124 40242	1µF 20% 63V
2130	4822 126 11585	22nF +80/-20% 25V
2131	4822 122 33325	470nF 16V
2132	4822 122 33325	470nF 16V
2133	4822 124 40242	1µF 20% 63V
2134	4822 126 13188	15nF 5% 63V
2135	4822 122 32927	220nF +80/-20% 50V
2136	4822 126 13188	15nF 5% 63V
2137	4822 122 32927	220nF +80/-20% 50V
2138	4822 124 41576	2,2µF 20% 50V
2139	4822 126 10002	100nF 20% 25V
2140	4822 121 51252	470nF 5% 63V
2141	4822 122 31947	100nF 20% 63V
2142	4822 122 31947	100nF 20% 63V
2143	4822 122 32927	220nF +80/-20% 50V
2144	4822 124 40242	1µF 20% 63V
2145	4822 122 33575	220pF 5% 50V
2147	4822 122 33575	220pF 5% 50V
2148	4822 122 33809	22nF 20% 50V
2150	4822 122 31947	100nF 20% 63V
2151	4822 126 14236	15pF 5% 50V
2152	4822 126 13695	82pF 1% 63V
2158	4822 122 31947	100nF 20% 63V
2160	4822 122 32139	12pF 2% 63V
2161	5322 122 34123	1nF 10% 50V
2162	4822 124 81151	22µF 50V

RESISTORS

3103	4822 051 20008	0R Jumper 0805
3104	4822 051 10102	1k 2% 0,25W
3107	4822 051 20829	82R 5% 0,1W
3108	4822 117 11449	2k2 1% 0,1W
3109	4822 117 11449	2k2 1% 0,1W
3120	4822 051 20008	0R Jumper 0805
3123	4822 051 10008	0R Jumper 1206
3124	4822 051 10008	0R Jumper 1206
3125	4822 116 83864	10k 5% 0,5W
3128	4822 116 52256	2k2 5% 0,5W
3129	4822 051 20008	0R Jumper 0805
3130	4822 051 10008	0R Jumper 1206
3131	4822 051 10008	0R Jumper 1206
3132	4822 051 20008	0R Jumper 0805
3134	4822 051 20223	22k 5% 0,1W
3137	4822 117 10833	10k 1% 0,1W
3138	4822 051 20008	0R Jumper 0805
3139	4822 051 10008	0R Jumper 1206
3140	4822 051 20331	330R 5% 0,1W
3141	4822 117 11148	56k 1% 0,1W
3142	4822 100 11163	Trimmer 100k 30% 0,1W
3143	4822 051 20223	22k 5% 0,1W
3144	4822 051 10102	1k 2% 0,25W
3145	4822 117 11449	2k2 1% 0,1W
3146	4822 051 20479	47R 5% 0,1W
3147	4822 051 10008	0R Jumper 1206
3150	4822 051 20472	4k7 5% 0,1W
3151	4822 051 20683	68k 5% 0,1W
3152	4822 051 20471	470R 5% 0,1W
3153	4822 051 20471	470R 5% 0,1W
3154	4822 116 83872	220R 5% 0,5W
3155	4822 116 52219	330R 5% 0,5W
3158	4822 116 83883	470R 5% 0,5W
3159	4822 116 83883	470R 5% 0,5W
3160	4822 116 83883	470R 5% 0,5W
3161	4822 116 83883	470R 5% 0,5W
3162	4822 117 13579	220k 1% 0,1W
3163	4822 051 10008	0R Jumper 1206
3164	4822 052 10478 ⚠	4R7 5% 0,33W
3165	4822 051 10008	0R Jumper 1206
3167	4822 116 83872	220R 5% 0,5W
3169	4822 051 20008	0R Jumper 0805
3171	4822 051 20008	0R Jumper 0805
3172	4822 051 10008	0R Jumper 1206
3173	4822 051 20008	0R Jumper 0805
3176	4822 051 20008	0R Jumper 0805
3177	4822 051 20223	22k 5% 0,1W
3178	4822 051 10008	0R Jumper 1206
3181	4822 051 10008	0R Jumper 1206
3183	4822 051 10008	0R Jumper 1206
3184	4822 051 10008	0R Jumper 1206
3185	4822 051 10008	0R Jumper 1206
3186	4822 051 10102	1k 2% 0,25W
3188	4822 051 10008	0R Jumper 1206
3192	4822 051 20008	0R Jumper 0805
3197	4822 051 20472	4k7 5% 0,1W

COILS & FILTERS

5102	4822 157 71634	MW Aerial
5103	4822 157 71635	LW Aerial

5107	4822 157 11443	FM Discriminator 10,7MHz
5109	4822 157 71639	Ceram Filter 10,7MHz
5110	4822 242 70665	Ceram Filter 10,7MHz
5111	4822 158 60511	AM-IF Filter 450kHz
5112	4822 157 70302	AM-IF Filter 450kHz
5114	4822 157 70302	AM_IF Filter 450kHz
5115	4822 157 71636	Anti-Birdy Filter
5121	4822 242 10261	X'tal Resonator 75kHZ
5122	4822 157 60517	RF Coil AM
5123	4822 157 60517	RF Coil AM

DIODES

6105	4822 130 83075	HN1V02H-B
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1
7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

Note : Only the parts mentioned in this list are normal service spare parts.

ETF5-FE TAPE MODULE

(Non-Dolby Version)

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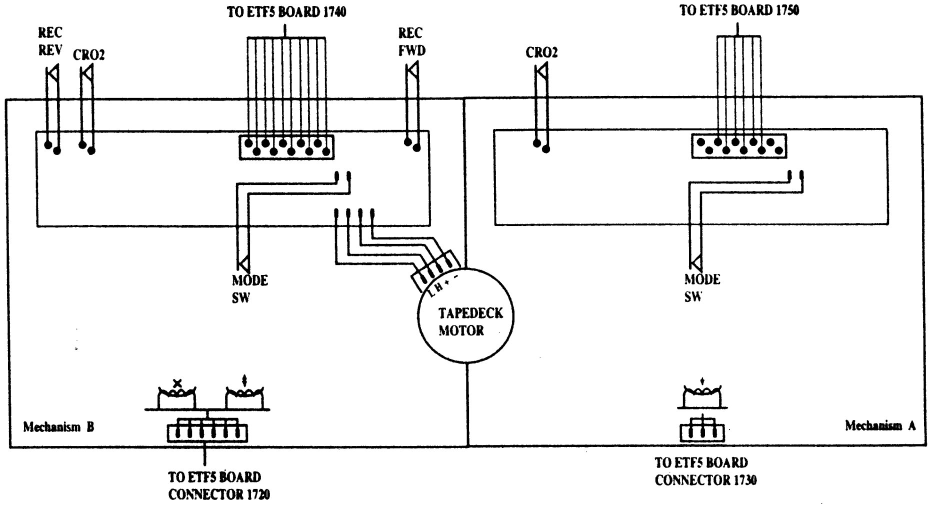
Electrical parts list.. 9-12

Tapedeck wiring (Double deck)

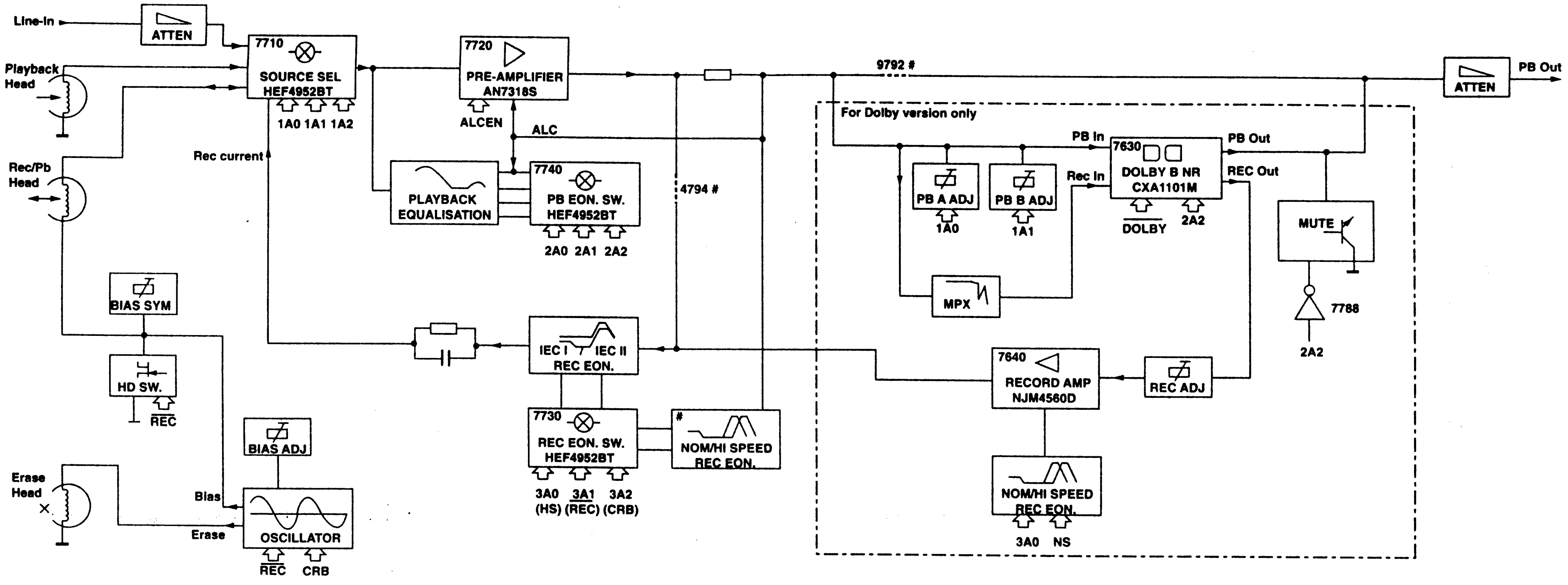

TO ETF5 BOARD 1740
REC REV
CRO2
REC FWD
CRO2
TO ETF5 BOARD 1750
MODE SW
TAPEDECK MOTOR
MODE SW
Mechanism B
Mechanism A
TO ETF5 BOARD CONNECTOR 1720
TO ETF5 BOARD CONNECTOR 1730

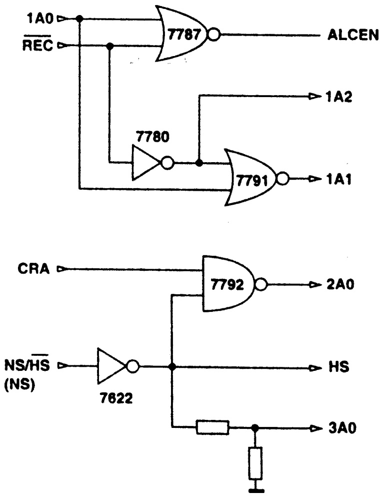
OPTIONS / VARIANTS TABLE

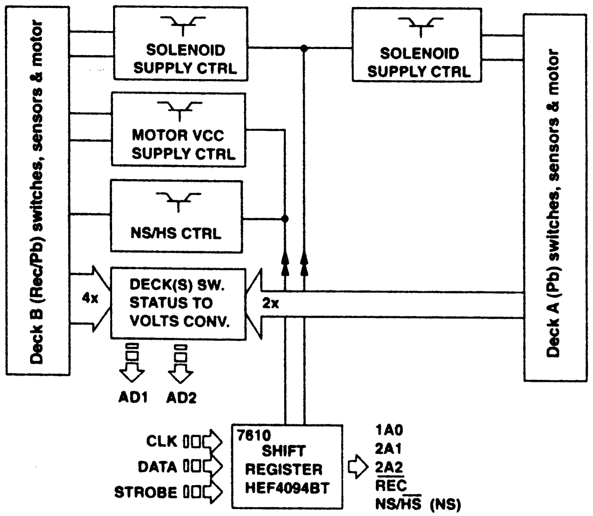
MODULE	ETF5-FE		ETF5A-FE			
VARIANT	1	2	3	4		
NAME	DB/DD/FR	ND/DD/FR	DB/DD/FR	ND/DD/FR		
Deck configuration	double	double	double	double		
Autoreverse	yes (B)	yes (B)	yes (B)	yes (B)		
Auto-replay	no	no	no	no		
Motor configuration	single	single	single	single		
Auto tape type selection	yes	yes	yes	yes		
Dolby B type Noise Reduction	yes	no	yes	no		
19 kHz pilot suppression	yes	no	yes	no		
High speed dubbing	yes	yes	yes	yes		

DB = Dolby B NR
DD = Double Deck
FF = Non-Autoreverse
FR = Autoreverse Deck B
ND = Non-Dolby
SD = Single Deck

BLOCK DIAGRAM


Line-In
ATTEN
Playback Head
Rec/Pb Head
Erase Head
7710
SOURCE SEL
HEF4952BT
1A0 1A1 1A2
7720
PRE-AMPLIFIER
AN7318S
ALCEN
ALC
Rec current
PLAYBACK EQUALISATION
7740
PB EQN. SW.
HEF4952BT
2A0 2A1 2A2
4794 #
9792 #
ATTEN
PB Out
For Dolby version only
PB In
7630
DOLBY B NR
CXA1101M
PB Out
Rec In
REC Out
PB A ADJ
PB B ADJ
1A0
1A1
DOLBY
2A2
MUTE
7788
2A2
MPX
BIAS SYM
HD SW.
REC
IEC I
IEC II
REC EQN.
7640
RECORD AMP
NJM4560D
REC ADJ
7730
REC EQN. SW.
HEF4952BT
3A0 3A1 3A2
(HS) (REC) (CRB)
#
NOM/HI SPEED REC EQN.
NOM/HI SPEED REC EQN.
3A0 NS
BIAS ADJ
Bias
Erase
OSCILLATOR
REC CRB


1A0
REC
7787
ALCEN
1A2
7780
7791
1A1
CRA
7792
2A0
NS/HS
(NS)
7622
HS
3A0


Deck B (Rec/Pb) switches, sensors & motor
SOLENOID SUPPLY CTRL
SOLENOID SUPPLY CTRL
MOTOR VCC SUPPLY CTRL
NS/HS CTRL
DECK(S) SW. STATUS TO VOLTS CONV.
4x
2x
Deck A (Pb) switches, sensors & motor
AD1 AD2
CLK
DATA
STROBE
7610
SHIFT REGISTER
HEF4094BT
1A0
2A1
2A2
REC
NS/HS (NS)

NOTE: # For Non-dolby version only
Only 1 channel is presented.

▯▯⇨ MicroProcessor Control / Communication lines

⇨ Direct / Indirect Control lines from Shift Registers

Brief introduction

General

1. Playback Mode

   Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952B). The signal is amplified by amplifier IC7720 (AN7318S) before feeding to the IC7740 (HEF4952B) and out to the AF Board via connector 1701. For Dolby sets the signal from IC7740 will pass through IC7630 (CXA1551M) for dolby noise processing before going to the connector 1701.

2. Recording Mode

   Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then amplified by the amplifier IC7720 (AN7318S). The amplified output signal will pass through IC7730 (HEF4952B) for record equalization and back to IC7710 (HEF4952B) before registered into the Rec/PB Head of Deck B. For Dolby sets the amplified wll pass through IC7630 (CXA1551M) for dolby noise processing, amplified to the right level by IC7640 (NJM4560M) before record equalization.

3. Dubbing Mode

   In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then equalised for playback mode by the amplifier IC7720 (AN7318S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.

4. Mode Selector

   The Mode Selector IC7710 (HEF4952B) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.

5. Amplifier PB/REC

   Amplifier IC7720 (AN7318S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.

6. Automatic Level Control (ALC)

   ALC circuit consists of resistors (3760, 3765, 3766, 3767), capacitors (2762 , 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.

7. Muting Circuit (For Non-Dolby only)

   Switch S4 of the IC7740 (HEF4952B) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.

8. IC7740 (HEF4952B)

   The function of the IC7740 (HEF4952B) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.

9. IC7730 (HEF4952B)

   The function of the IC7730 (HEF4952B) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).

10. Bias Level

    Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.

11. Bias Symm (For Dolby only)

    Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.

12. PB Switch

    Playback Switch which consists of the FETs 7785 (For Dolby only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

13. Muting Circuit

    The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

14. Motor Speed

    During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.

15. IC7610 (HEF4094BT)

    IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952B) via 1A0, 2A1 and 2A2. It also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is controlled via NS/HS.

Dolby Circuit (For sets with Dolby B NR only)

16. IC7630 (CXA1551M)

    IC7630 (CXA1551M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by $\overline{\text{DOLBY}}$, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/LOW for NR OFF/ON.

17. 19kHz Filter

    The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.

18. Level Adjust

    The Variable resistor 3635, 3636,3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz , 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.

19. Amplifier IC7640 (NJM4560M)

    The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non Auto Reverse
FR	Auto Reverse on Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

CONNECTORS ASSIGNMENTS:

CONNECTOR 1701 — INTERCONNECTION TO AF BOARD

O	1	REC-L	Record input left
O	2	REC-R	Record input right
O	3	GND A	AF Ground
O	4	TAPE-L	Playback output left
O	5	+12V	D.C. supply (+12V) in
O	6	TAPE-R	Playback output right
O	7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703 — INTERCONNECTION TO AF BOARD

O	1	GND M	Motor Ground
O	2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706 — INTERCONNECTION TO FRONT BOARD

O	1	AD2	Deck sensing switches output voltage / Deck A EOT
O	2	AD1	Deck sensing switches output voltage / Deck B EOT
O	3	+5	DC supply +5V for ADC network
O	4	GND P	Control & Oscillator Ground
O	5	CLK	HEF4094BT shift register Clock line
O	6	DATA	HEF4094BT shift register Data line
O	7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710 — DECK B HEADS CONNECTON *(For ETF6... only)*

O	1	B R/P HD L+	R/P Head left channel positive
O	2	GND A	R/P Head return ground
O	3	B R/P HD R+	R/P Head right channel positive
O	4	ERASE HEAD	Erase Head
O	5	GND A	Erase Head ground

CONNECTOR 1720 — DECK B HEADS CONNECTON *(For ETF5... only)*

O	1	B R/P HD L+	R/P Head left channel positive
O	2	B R/P HD L-	R/P Head left channel negative
O	3	B R/P HD R+	R/P Head right channel positive
O	4	B R/P HD R-	R/P Head right channel negative
O	5	ERASE HEAD	Erase Head
O	6	GND A	Erase Head ground

CONNECTOR 1730 — DECK A HEAD CONNECTIONS *(For Double Deck versions only)*

O	1	A PB HD L+	Pb Head left channel positive
O	2	GND A	Pb Head return ground shield
O	3	A PB HD R+	Pb Head right channel positive

CONNECTOR 1740 — DECK B CONTROL INTERFACE *(For ETF5... Double Deck only)*

O	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
O	2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
O	3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
O	4	PHOTO B	Photo sensor output (tape movement indication)	
O	5	SOL B	Solenoid supply	
O	6	Vcc	Deck / Motor supply	
O	7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
O	8	GND M	Deck / Motor ground	
O	9	H	H pin for motor	
O	10	L	L pin for motor	

CONNECTOR 1750 — DECK A CONTROL INTERFAC *(For ETF5... Double Deck only)*

O	1	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
O	2	PHOTO A	Photo sensor output (tape movement indication)	
O	3	SOL A	Solenoid supply	
O	4	Vcc	Deck/Motor supply	
O	5	MODE	Mode switch (head engagement)	[open=off: close=engaged]
O	6	GND M	Deck/Motor ground	

CONNECTOR 1760 — DECK B CONTROL INTERFACE *(For Single Deck only)*

O	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
O	2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
O	3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
O	4	PHOTO B	Photo sensor output (tape movement indication)	
O	5	SOL B	Solenoid supply	
O	6	Vcc	Deck / Motor supply	
O	7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
O	8	GND M	Deck / Motor ground	

CONNECTOR 1770 — DECK A & B CONTROL INTERFACE *(For ETF6... only)*

O	1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
O	2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
O	3	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
O	4	PHOTO B	Photo sensor output (tape movement indication)	
O	5	SOL B	Solenoid supply for deck B	
O	6	Vcc	Deck / Motor supply	
O	7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
O	8	GND M	Deck / Motor ground	
O	9	L	L pin for motor	
O	10	H	H pin for motor	
O	11	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
O	12	SOL A	Solenoid supply for deck A	
O	13	PHOTO A	Photo sensor output (tape movement indication)	

TAPE MECHANISM A ELECTRONICS

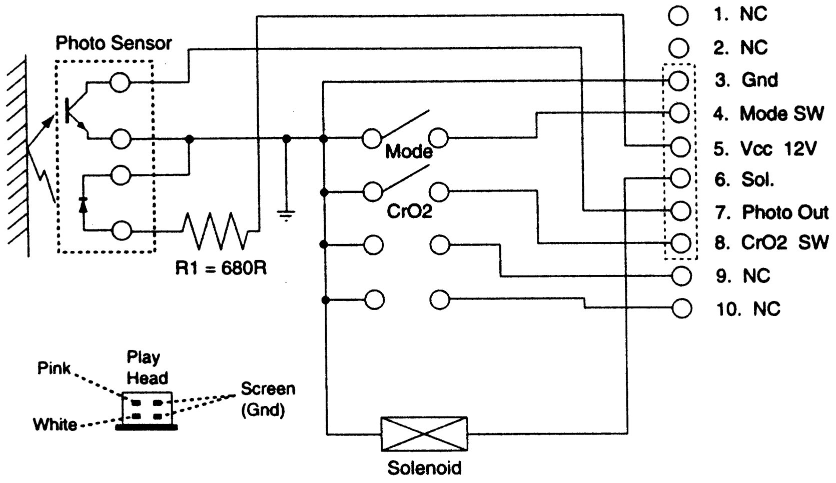
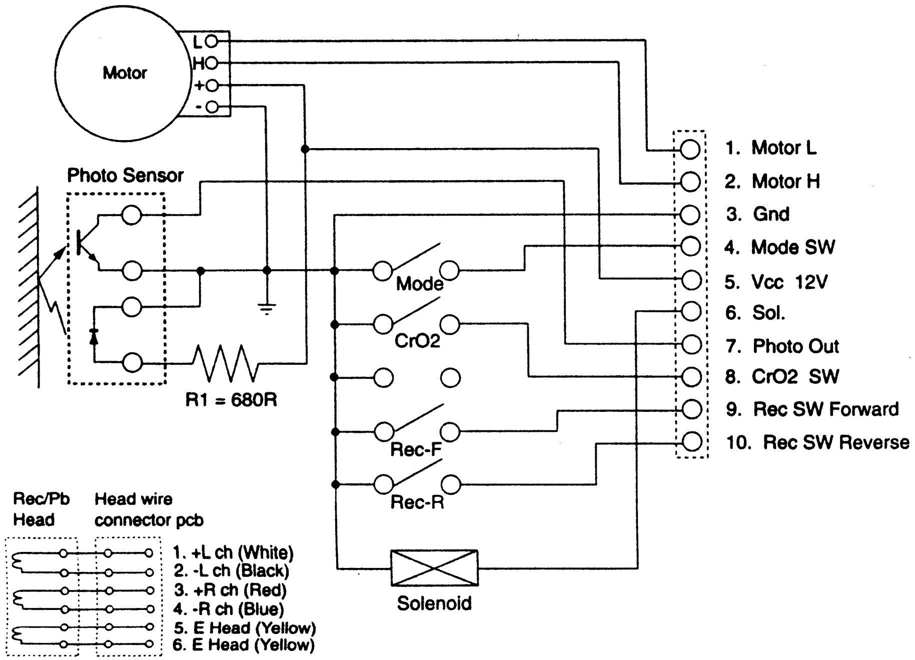


Photo Sensor
R1 = 680R
Mode
CrO2
1. NC
2. NC
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. NC
10. NC
Pink
Play Head
Screen (Gnd)
White
Solenoid

TAPE MECHANISM B ELECTRONICS


Motor
L
H
+
-
Photo Sensor
R1 = 680R
Mode
CrO2
Rec-F
Rec-R
1. Motor L
2. Motor H
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. Rec SW Forward
10. Rec SW Reverse
Solenoid
Rec/Pb Head
Head wire connector pcb
1. +L ch (White)
2. -L ch (Black)
3. +R ch (Red)
4. -R ch (Blue)
5. E Head (Yellow)
6. E Head (Yellow)

TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
ADJUST MOTOR SPEED						
NORMAL SPEED	SBC420 3150Hz	PLAY B	◇1 or ◇2 LEFT RIGHT	frequency counter	3620	3150Hz ± 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 3150Hz	PLAY	◇1 or ◇2 LEFT RIGHT	W&F-meter	check	≤0.4 % DIN
ADJUST AZIMUTH						
DECK A & B	SBC420 10kHz	PLAY FWD	◇1 or ◇2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	
CHECK PLAYBACK FREQUENCY RESPONSE						
DECK A & B	SBC420	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	check	limits see fig.1
ADJUST BIAS CURRENT						
DECK B	SBC419A	RECORD	◇5 or ◇6 LEFT RIGHT	mV-meter	3773	995mV
	SBC420				check	750mV ± 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via ◇3 or ◇4	SBC419A or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	◇1 or ◇2 LEFT RIGHT	mV-meter	check	limits see fig. 2 *
Inject 1kHz 8.85mV via ◇3 or ◇4	SBC419A or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	◇1 or ◇2 LEFT RIGHT	THD-meter	check	≤3% *

SBC419A : 4822 397 30069
SBC420 : 4822 397 30071

# For Auto-reverse version only

* If high frequencies are not within limits, decrease bias and re-measure.
If distortion is too high, increase bias and re-meaure

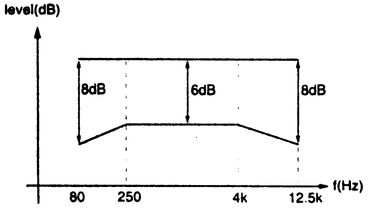


figure. 1

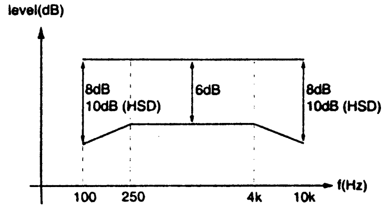
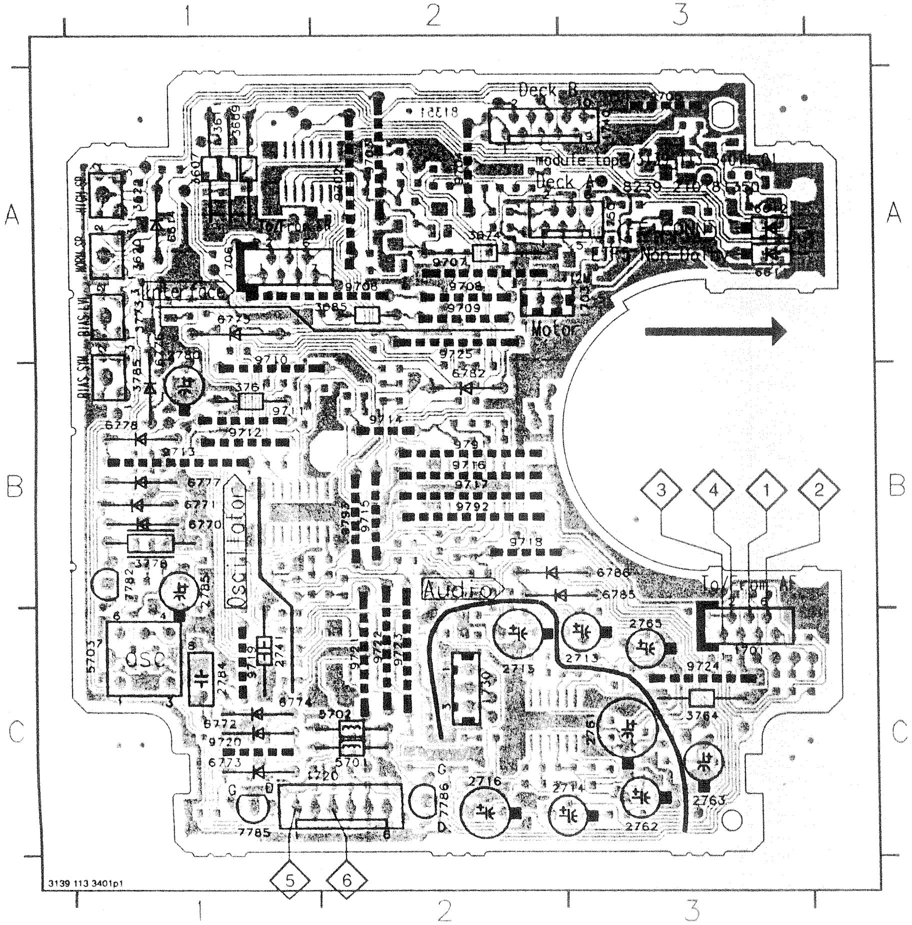


figure. 2

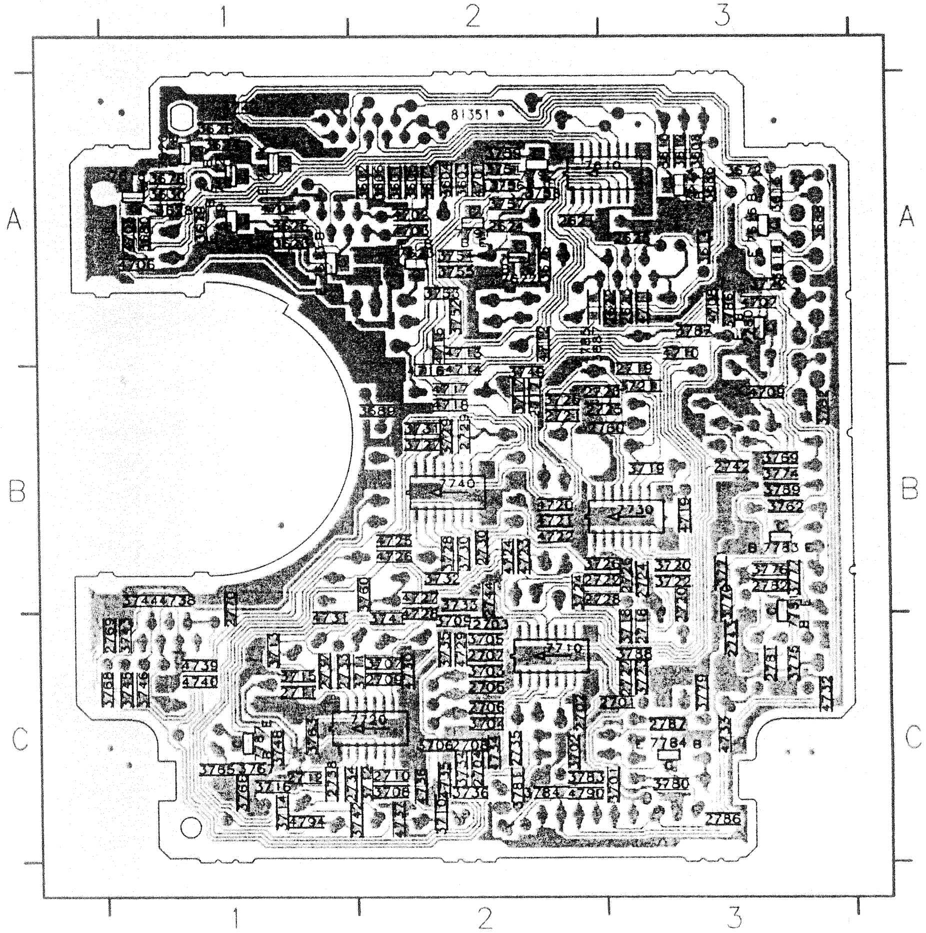
COMPONENT LAYOUT

1701	C3	2715	C2	2785	B1	3764	C3	6614	A1	6778	B1	9704	A2	9713	B1	9722	C2
1703	A3	2716	C2	3607	A1	3773	A1	6770	B1	6782	B2	9705	A3	9714	B2	9723	C2
1706	A1	2741	C1	3609	A1	3778	B1	6771	B1	6785	B3	9706	A2	9715	B2	9724	C3
1720	C2	2761	C3	3611	A1	·3785	B1	6772	C1	6786	B3	9707	A2	9716	B2	9725	A2
1730	C2	2762	C3	3620	A1	5701	C2	6773	C1	7782	B1	9708	A2	9717	B2	9791	B2
1740	A3	2763	C3	3622	A1	5702	C2	6774	C1	7785	C1	9709	A2	9718	B2	9792	B2
1750	A3	2765	C3	3674	A2	5703	C1	6775	A1	7786	C2	9710	A1	9719	C1	9793	B2
2713	C3	2780	A1	3685	A2	6611	A3	6776	A1	9702	A2	9711	B1	9720	C1		
2714	C3	2784	C1	3761	B1	6612	A3	6777	B1	9703	A2	9712	B1	9721	C2		

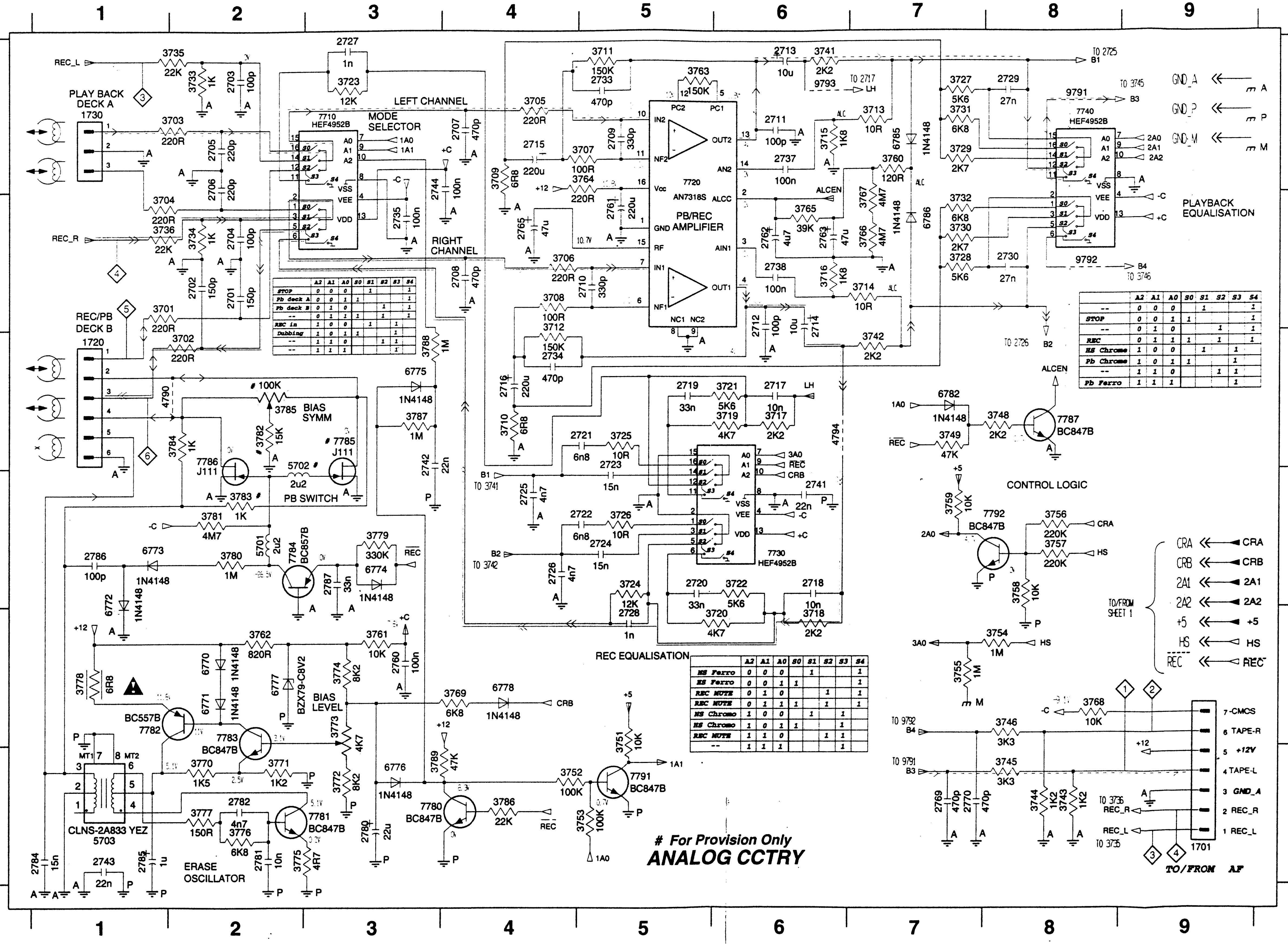


CHIP LAYOUT

2621	A2	2725	B3	3605	A2	3702	C2	3727	B2	3758	A2	3788	C3	4724	B2	7616	A3
2622	A3	2726	B3	3606	A2	3703	C2	3728	B2	3759	A2	3789	B3	4725	B2	7618	A1
2623	A3	2727	C3	3608	A3	3704	C2	3729	B2	3760	B2	4701	A2	4726	B2	7619	A1
2624	A2	2728	B2	3610	A3	3705	C2	3730	B2	3762	B3	4702	A2	4727	B2	7620	A1
2625	A3	2729	B2	3612	A3	3706	C2	3731	B2	3763	C1	4703	A2	4728	C2	7622	A2
2701	C3	2730	B2	3613	A2	3707	C2	3732	B2	3765	C1	4704	A1	4729	C2	7623	A2
2702	C2	2733	C1	3614	A3	3708	C2	3733	B2	3766	C1	4705	A1	4730	C2	7624	A3
2703	C2	2734	C1	3616	A3	3709	C2	3734	C2	3767	C1	4706	A1	4731	C1	7710	C2
2704	C2	2735	C2	3618	A3	3710	C2	3735	C2	3768	C1	4707	A3	4732	C3	7720	C2
2705	C2	2737	C1	3623	A1	3711	C2	3736	C2	3769	B3	4708	A3	4733	C3	7730	B3
2706	C2	2738	C1	3624	A1	3712	C2	3741	C2	3770	B3	4709	B3	4734	C2	7740	B2
2707	C2	2742	B3	3625	A1	3713	C1	3742	C1	3771	B3	4710	A3	4735	C2	7780	A3
2708	C2	2743	C3	3626	A1	3714	C1	3743	C1	3772	A3	4711	A3	4736	C2	7781	B3
2709	C2	2744	B2	3628	A1	3715	C1	3744	B1	3774	B3	4712	A2	4737	C2	7783	B3
2710	C2	2760	B3	3630	A1	3716	C1	3745	C1	3775	C3	4713	A2	4738	B1	7784	C3
2711	C1	2769	C1	3672	A3	3717	B2	3746	C1	3776	B3	4714	B2	4739	C1	7787	C1
2712	C1	2770	B1	3676	A2	3718	C3	3748	C1	3777	B3	4715	A2	4740	C1	7791	A2
2717	B2	2781	C3	3678	A1	3719	B3	3749	B2	3779	C3	4716	B2	4743	A1	7792	A2
2718	C3	2782	B3	3679	A1	3720	B3	3751	A2	3780	C3	4717	B2	4785	A2		
2719	B3	2786	C3	3680	A1	3721	B3	3752	A2	3781	C2	4718	B2	4790	C2		
2720	B3	2787	C3	3686	A3	3722	B3	3753	A2	3782	B3	4719	B3	4794	C1		
2721	B2	3601	A2	3687	A2	3723	C3	3754	A2	3783	C2	4720	B2	7610	A3		
2722	B2	3602	A2	3688	A3	3724	B2	3755	A2	3784	C2	4721	B2	7612	A1		
2723	B2	3603	A2	3689	B2	3725	B2	3756	A2	3786	A3	4722	B2	7613	A1		
2724	B3	3604	A2	3701	C3	3726	B2	3757	A2	3787	A3	4723	B2	7614	A1		



ANALOG CIRCUIT


1 2 3 4 5 6 7 8 9
A B C D E F
REC_L
REC_R
PLAY BACK DECK A
1730
REC/PB DECK B
1720
3735 22K
3733 1K
2703 100p
3703 220R
2705 220p
2706 220p
3704 220R
3736 22K
3734 1K
2704 100p
2702 150p
2701 150p
3701 220R
3702 220R
4790
2727 1n
3723 12K
7710 HEF4952B
MODE SELECTOR
LEFT CHANNEL
RIGHT CHANNEL
1A0
1A1
2707 470p
2744 100n
2735 100n
2708 470p
3705 220R
2715 220u
3707 100R
3709 6R8
3764 220R
2761 220u
2709 330p
2765 47u
3706 220R
2710 330p
3708 100R
3712 150K
2734 470p
2716 220u
3710 6R8
3711 150K
2733 470p
3763 150K
7720 AN7318S
PB/REC AMPLIFIER
IN2
OUT2
NF2
Vcc
ALCC
GND
RF
IN1
OUT1
NF1
NC1 NC2
AN2
AIN1
PC2 PC1
2713 10u
3741 2K2
TO 2725 B1
TO 2717 LH
9793
2711 100p
3715 1K8
3713 10R
2737 100n
ALCEN
3765 39K
2762 4u7
2763 47u
3767 4M7
3766 4M7
3760 120R
6785 1N4148
6786 1N4148
2738 100n
3716 1K8
3714 10R
2712 100p
2714 10u
3742 2K2
ALC
3727 5K6
2729 27n
3731 6K8
3729 2K7
3732 6K8
3730 2K7
3728 5K6
2730 27n
9791
TO 3745 B3
9792
B4 TO 3746
TO 2726 B2
7740 HEF4952B
PLAYBACK EQUALISATION
2A0
2A1
2A2
GND_A
GND_P
GND_M
2719 33n
3721 5K6
2717 10n
LH
3719 4K7
3717 2K2
4794
2721 6n8
3725 10R
2723 15n
B1 TO 3741
2725 4n7
3A0
REC
CRB
2741 22n
2722 6n8
3726 10R
2724 15n
B2 TO 3742
2726 4n7
7730 HEF4952B
3724 12K
2728 1n
2720 33n
3722 5K6
3720 4K7
2718 10n
3718 2K2
REC EQUALISATION
# 100K
3785 BIAS SYMM
3782 15K
# 7785 J111
3784 1K
7786 J111
5702 2u2
3783 1K
PB SWITCH
3781 4M7
5701 2u2
7784 BC857B
3779 330K
6774 1N4148
2787 33n
2786 100p
6773 1N4148
3780 1M
6772 1N4148
6775 1N4148
3787 1M
3788 1M
2742 22n
3762 820R
3761 10K
2760 100n
3778 6R8
6770 1N4148
6771 1N4148
6777 BZX79-C8V2
3774 8K2
BIAS LEVEL
3773 4K7
3772 8K2
BC557B 7782
7783 BC847B
3770 1K5
3771 1K2
MT1 MT2
CLNS-2A833 YEZ
5703
3777 150R
2782 4n7
3776 6K8
7781 BC847B
2781 10n
3775 4R7
ERASE OSCILLATOR
2784 15n
2743 22n
2785 1u
3769 6K8
6778 1N4148
CRB
6776 1N4148
2780 22u
3789 47K
7780 BC847B
3786 22K
3752 100K
3753 100K
1A0
3751 10K
7791 BC847B
1A1
6782 1N4148
3748 2K2
7787 BC847B
3749 47K
CONTROL LOGIC
3759 10K
7792 BC847B
2A0
3756 220K
CRA
3757 220K
HS
3758 10K
3754 1M
3755 1M
3768 10K
3746 3K3
TO 9792 B4
3745 3K3
TO 9791 B3
2769 470p
2770 470p
3744 1K2
3743 1K2
TO 3736 REC_R
REC_L TO 3735
1701
7-CMCS
6 TAPE-R
5 +12V
4 TAPE-L
3 GND_A
2 REC_R
1 REC_L
TO/FROM AF
TO/FROM SHEET 1
CRA CRB 2A1 2A2 +5 HS REC
+12 +5 +C -C
A P M
# For Provision Only
ANALOG CCTRY

	A2	A1	A0	S0	S1	S2	S3	S4
STOP	0	0	0		1			1
Pb deck A	0	0	1	1				1
Pb deck B	0	1	0			1		1
--	0	1	1	1		1		1
REC in	1	0	0		1		1	
Dubbing	1	0	1	1			1	
--	1	1	0			1	1	
--	1	1	1				1	

	A2	A1	A0	S0	S1	S2	S3	S4
--	0	0	0		1			1
STOP	0	0	1	1				1
--	0	1	0			1		1
REC	0	1	1	1		1		1
HS Chrome	1	0	0		1		1	
Pb Chrome	1	0	1	1			1	
--	1	1	0			1	1	
Pb Ferro	1	1	1				1	

	A2	A1	A0	S0	S1	S2	S3	S4
NS Ferro	0	0	0		1			1
HS Ferro	0	0	1	1				1
REC MUTE	0	1	0			1		1
REC MUTE	0	1	1	1		1		1
NS Chromo	1	0	0		1		1	
HS Chromo	1	0	1	1			1	
REC MUTE	1	1	0			1	1	
--	1	1	1				1	

- ->- Signal path Pb left channel

->>- Signal path REC right channel

DC Voltages measured with Dubbing Fe to Fe

1701 F9
1720 C1
1730 A1
2701 B2
2702 B2
2703 A2
2704 B2
2705 A2
2706 A2
2707 A4
2708 B4
2709 A5
2710 B5
2711 A6
2712 B6
2713 A6
2714 B6
2715 A4
2716 C4
2717 C6
2718 D6
2719 C5
2720 D5
2721 C5
2722 D5
2723 C5
2724 D5
2725 D4
2726 D4
2727 A3
2728 E5
2729 A8
2730 B8
2733 A5
2734 C4
2735 B3
2737 A6
2738 B6
2741 D6
2742 C3
2743 F1
2744 A3
2760 E3
2761 B5
2762 B6
2763 B6
2765 B4
2769 F7
2770 F7
2780 F3
2781 F2
2782 F2
2784 F1
2785 F1
2786 D1
2787 D3
3701 B1
3702 C2
3703 A2
3704 B1
3705 A4
3706 B4
3707 A5
3708 B4
3709 A4
3710 C4
3711 A5
3712 C4
3713 A7
3714 B7
3715 A6
3716 B6
3717 C6
3718 E6
3719 C6
3720 E6
3721 C6
3722 D6
3723 A3
3724 D5
3725 C5
3726 D5
3727 A7
3728 B7
3729 A7
3730 B7
3731 A7
3732 B7
3733 A2
3734 B2
3735 A2
3736 B1
3741 A6
3742 C7
3743 F8
3744 F8
3745 F8
3746 E8
3748 C8
3749 C7
3751 E5
3752 F4
3753 F5
3754 E8
3755 E7
3756 D8
3757 D8
3758 D8
3759 D7
3760 A7
3761 E3
3762 E2
3763 A5
3764 A5
3765 B6
3766 B7
3767 B7
3768 E8
3769 E4
3770 F2
3771 F2
3772 F3
3773 E3
3774 E3
3775 F2
3776 F2
3777 F2
3778 E1
3779 D3
3780 D2
3781 D2
3782 C2
3783 D2
3784 C2
3785 C2
3786 F4
3787 C3
3788 C3
3789 F3
4790 C1
4794
5701
5702
5703
6770
6771
6772
6773
6774
6775
6776
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6786
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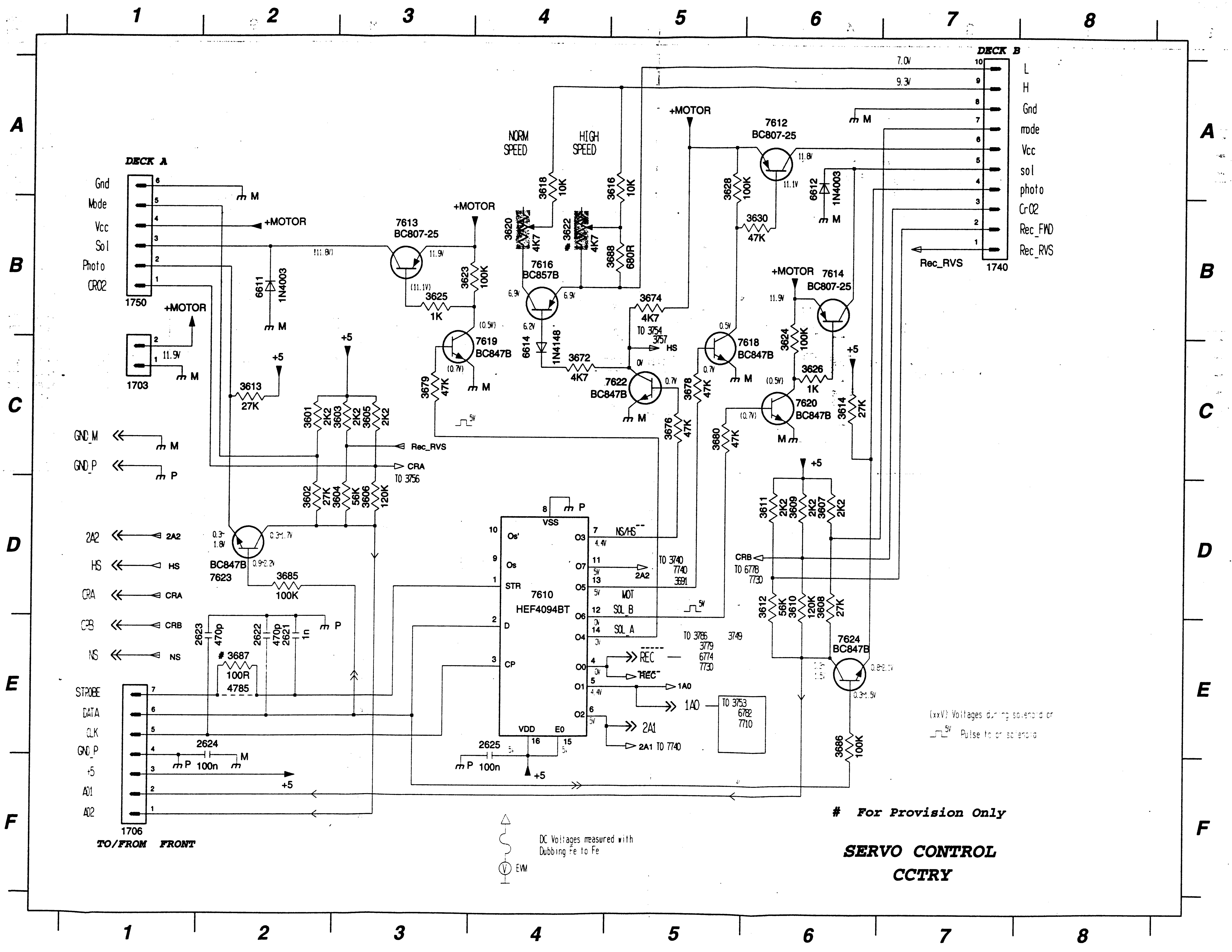
9791
9792
9793

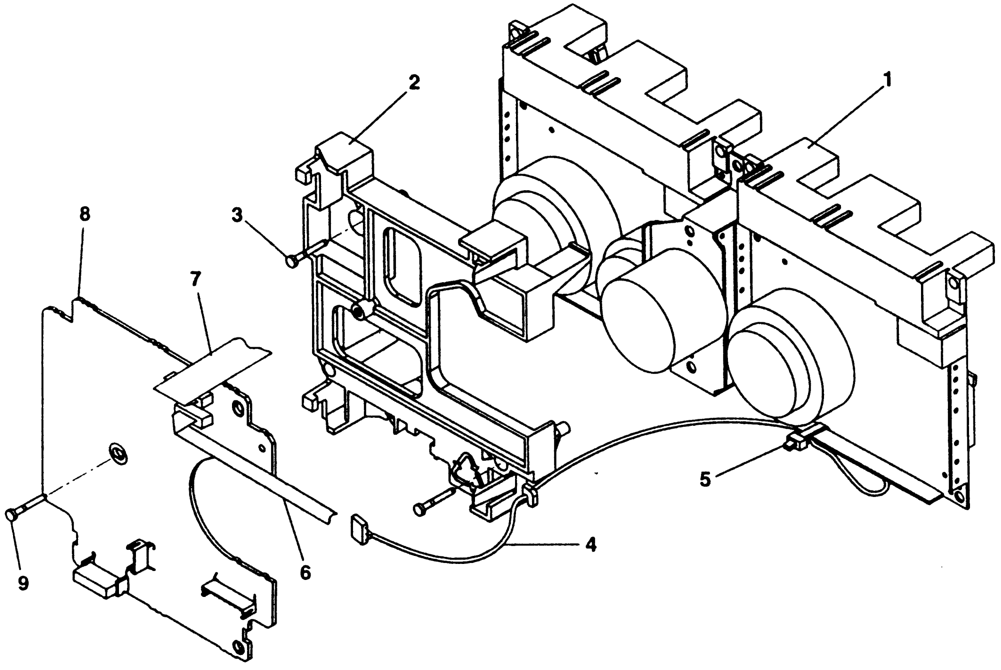
SERVO CONTROL CIRCUIT


1
2
3
4
5
6
7
8
A
B
C
D
E
F
DECK A
Gnd
Mode
Vcc
Sol
Photo
CRO2
1750
1703
11.9V
+MOTOR
M
P
+5
6611
1N4003
3613
27K
3601 2K2
3603 2K2
3605 2K2
3602 27K
3604 56K
3606 120K
Rec_RVS
CRA
TO 3756
7613
BC807-25
11.9V
(11.1V)
3625
1K
3623
100K
7619
BC847B
(0.5V)
(0.7V)
3679
47K
NORM SPEED
HIGH SPEED
3618
10K
3616
10K
3620
4K7
# 3622
4K7
3688
680R
7616
BC857B
6.9V
6.2V
6614
1N4148
3672
4K7
3674
4K7
TO 3754
3757
HS
7622
BC847B
0V
0.7V
3676
47K
3678
47K
7618
BC847B
0.5V
3680
47K
7612
BC807-25
11.8V
11.1V
3628
100K
3630
47K
6612
1N4003
7614
BC807-25
3624
100K
3626
1K
7620
BC847B
(0.5V)
(0.7V)
3614
27K
DECK B
7.0V
9.3V
L
H
Gnd
mode
Vcc
sol
photo
CrO2
Rec_FWD
Rec_RVS
1740
2A2
HS
CRA
CRB
NS
GND_M
GND_P
7623
BC847B
0.3-1.8V
3685
100K
2623
470p
2622
470p
2621
1n
# 3687
100R
4785
STROBE
DATA
CLK
GND_P
+5
A01
A02
2624
100n
1706
TO/FROM FRONT
7610
HEF4094BT
VSS
Os'
Os
STR
D
CP
VDD
E0
O3
O7
O5
O6
O4
O0
O1
O2
NS/HS
TO 3740
7740
3691
2A2
MOT
SOL_B
SOL_A
TO 3766
3779
6774
7730
3749
REC
1A0
TO 3753
6782
7710
2A1
2A1 TO 7740
2625
100n
CRB
TO 6778
7730
3611 2K2
3609 2K2
3607 2K2
3612 56K
3610 120K
3608 27K
7624
BC847B
3686
100K
(xxV) Voltages during solenoid on
Pulse to on solenoid
DC Voltages measured with Dubbing Fe to Fe
EVM

For Provision Only

SERVO CONTROL CCTRY

1703	C1
1706	F1
1740	B7
1750	B1
2621	E2
2622	E2
2623	E2
2624	E2
2625	E4
3601	C2
3602	D2
3603	C3
3604	D3
3605	C3
3606	D3
3607	D6
3608	D6
3609	D6
3610	D6
3611	D6
3612	D6
3613	C2
3614	C6
3616	A5
3618	A4
3620	B4
3622	B4
3623	B3
3624	C6
3625	B3
3626	C6
3628	A5
3630	B6
3672	C4
3674	B5
3676	C5
3678	C5
3679	C3
3680	C5
3685	D2
3686	E6
3687	E2
3688	B5
3689	F3
4785	E2
6611	B2
6612	A6
6614	C4
7610	D4
7612	A6
7613	B3
7614	B6
7616	B4
7618	C5
7619	C4
7620	C6
7622	C5
7623	D2
7624	E6



ETF5 TAPE MODULE EXPLODED VIEW

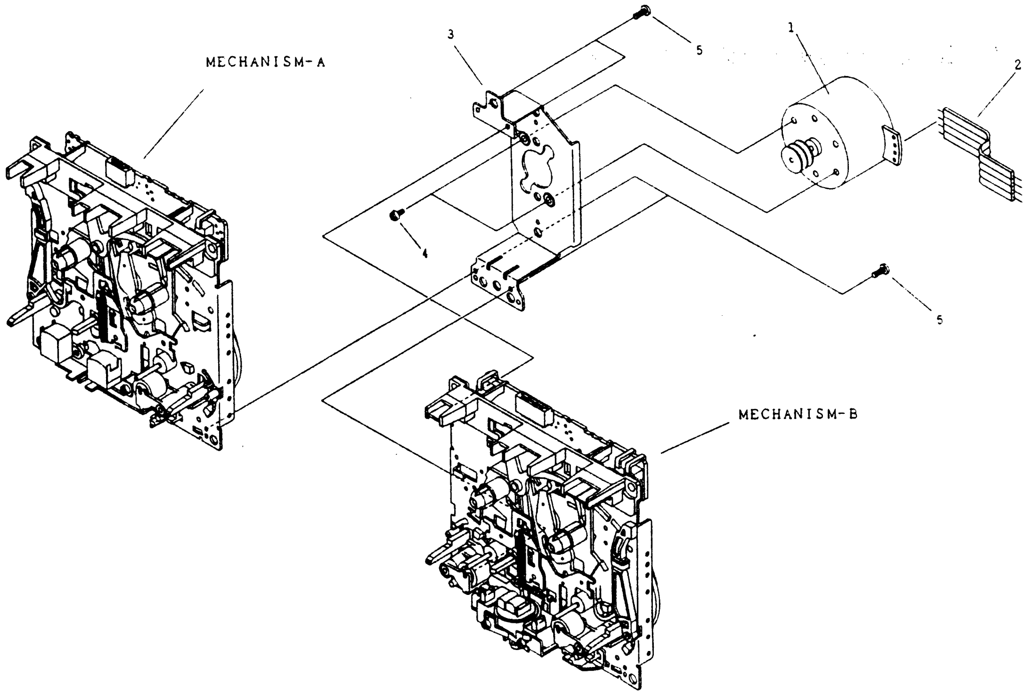
1	4822 691 10671	Tape Mechanism CWB44FR502
3	-	Screw M2 x 16
6	4822 320 12243	Flex Cable 6 pin 18 cm
7	4822 320 12242	Flex Cable 10 pin 7,5 cm
9	-	Screw D3 x 10

Note: Only the parts mentioned in this list are normal service spare parts.

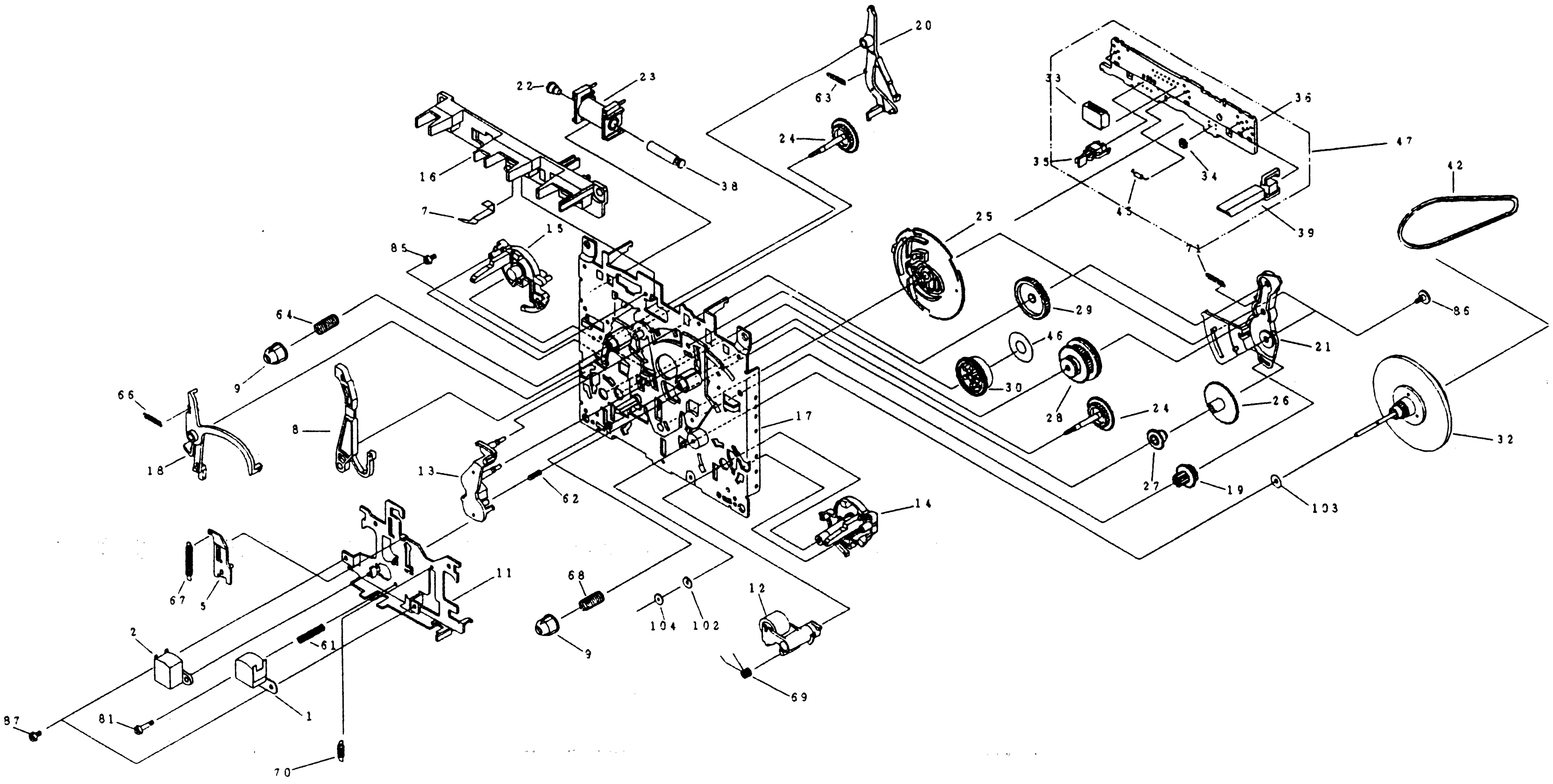
TAPE MECHANISM A & B EXPLODED VIEW

1	4822 361 10841	Motor Assembly
4	-	Screw M2,6 x 4
5	-	Screw M2 x 3

Note: Only the parts mentioned in this list are normal service spare parts.



TAPE MECHANISM A - PLAY


20
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64
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46
21
86
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66
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26
8
17
32
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27
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103
18
62
14
11
68
12
67
5
104
102
2
61
9
69
87
81
1
70

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10397	MS15RAA2N1
2	4822 249 30146	Dummy Head
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Solenoid
32	4822 528 11209	Assembly Flywheel RV
33	4822 265 11207	Connector Socket 6 pin
34	4822 130 10205	Photo Sensor
35	4822 276 13946	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10168	Belt AF 40mm
45	4822 050 16801	680R 1% 0,4w
69	4822 492 11542	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

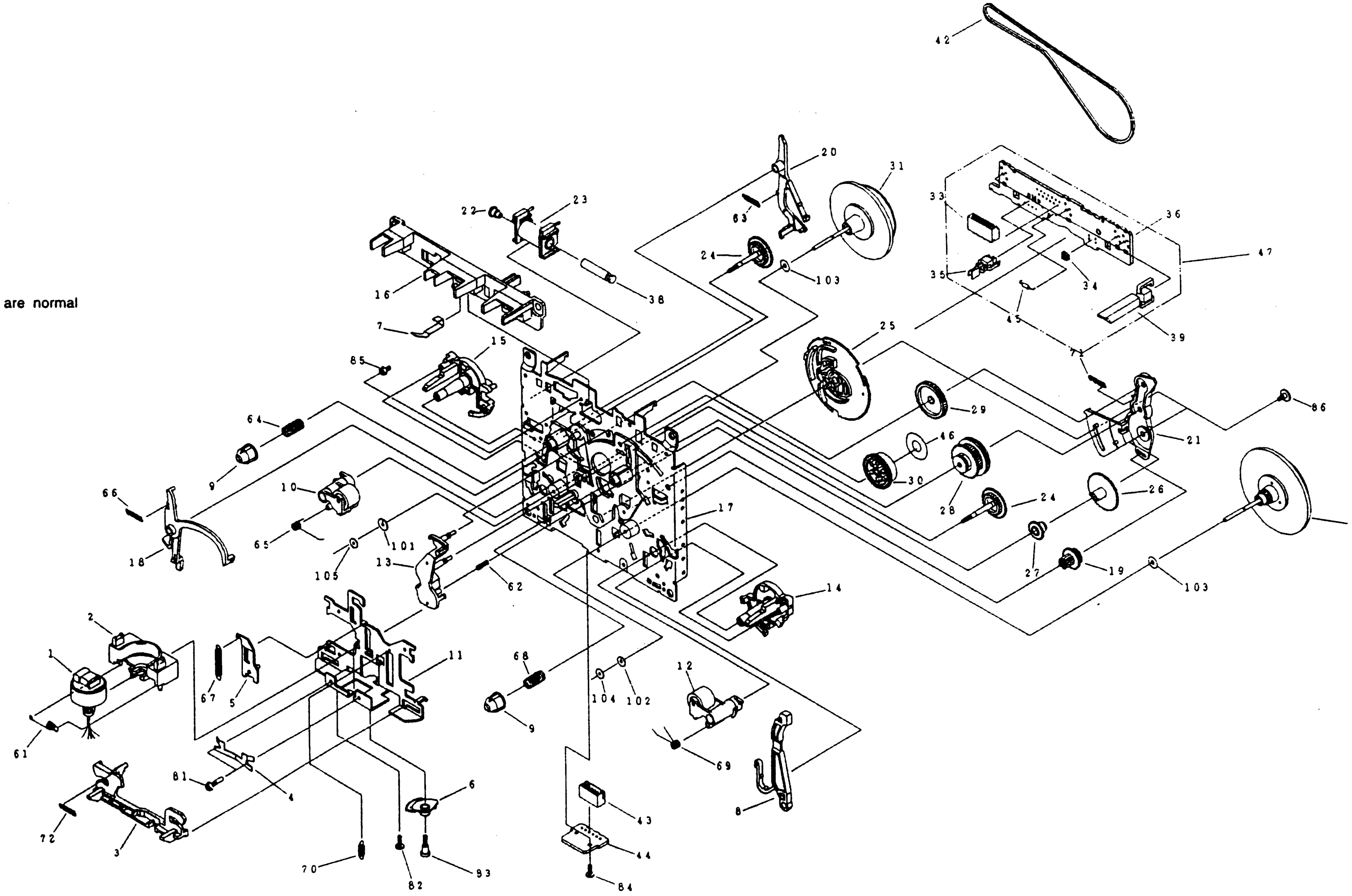
Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM B - RECORD/PLAYBACK

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10521	Record/Playback Head
10	4822 528 10975	Assembly Arm Pinch L
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Solenoid
31	4822 528 11211	Assembly Flywheel LV
32	4822 528 11209	Assembly Flywheel RV
33	4822 265 11208	Connector Socket 10 pin
34	4822 130 10205	Photo Sensor
35	4822 276 13946	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10169	Belt
45	4822 050 16801	680R 1% 0,4w
65	4822 492 11546	Spring
69	4822 492 11542	Spring
101	4822 532 12934	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
105	4822 532 12935	Washer

Note: Only the parts mentioned in this list are normal service spare parts.


42
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47
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23
63
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103
35
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16
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39
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25
71
85
86
64
29
46
21
66
10
9
30
26
28
24
32
17
65
101
13
105
62
27
19
103
14
2
1
11
68
12
67
5
104
102
9
61
81
4
69
6
8
43
72
3
70
82
83
44
84

MISCELLANEOUS

1701	4822 267 10953	Flex Socket 7pin Vert.
1706	4822 267 10953	Flex Socket 7pin Vert.
1740	4822 267 10729	Flex Socket 10pin Vert.
1750	4822 267 10731	Flex Socket 6pin Vert.

CAPACITORS

2621	5322 122 34123	1nF 10% 50V
2622	5322 122 34099	470pF 10% 63V
2623	5322 122 34099	470pF 10% 63V
2624	4822 126 13196	100nF 10% 25V.
2625	4822 126 13196	100nF 10% 25V
2701	5322 122 33538	150pF 2% 63V
2702	5322 122 33538	150pF 2% 63V
2703	5322 122 32531	100pF 5% 50V
2704	5322 122 32531	100pF 5% 50V
2705	4822 122 33575	220pF 5% 63V
2706	4822 122 33575	220pF 5% 63V
2707	5322 122 34099	470pF 10% 63V
2708	5322 122 34099	470pF 10% 63V
2709	5322 122 31863	330pF 5% 63V
2710	5322 122 31863	330pF 5% 63V
2711	5322 122 32531	100pF 5% 50V
2712	5322 122 32531	100pF 5% 50V
2713	4822 124 41579	10µF 20% 50V
2714	4822 124 41579	10µF 20% 50V
2715	4822 124 40196	220µF 20% 16V
2716	4822 124 40196	220µF 20% 16V
2717	4822 122 33177	10nF 20% 50V
2718	4822 122 33177	10nF 20% 50V
2719	4822 126 12105	33nF 5% 50V
2720	4822 126 12105	33nF 5% 50V
2721	5322 122 31866	6,8nF 10% 63V
2722	5322 122 31866	6,8nF 10% 63V
2723	4822 126 13188	15nF 5% 63V
2724	4822 126 13188	15nF 5% 63V
2725	5322 126 10223	4,7nF 10% 63V
2726	5322 126 10223	4,7nF 10% 63V
2727	5322 122 34123	1nF 10% 50V
2728	5322 122 34123	1nF 10% 50V
2729	4822 122 33735	27nF 10% 63V
2730	4822 122 33735	27nF 10% 63V
2733	5322 122 34099	470pF 10% 63V
2734	5322 122 34099	470pF 10% 63V
2735	4822 126 13196	100nF 10% 25V
2737	4822 126 13196	100nF 10% 25V
2738	4822 126 13196	100nF 10% 25V
2741	4822 126 11585	22nF +80/-20% 25V
2742	5322 122 32654	22nF 10% 63V
2743	5322 122 32654	22nF 10% 63V
2744	4822 126 13196	100nF 10% 25V
2760	4822 126 13196	100nF 10% 25V
2761	4822 124 22263	220µF 20% 25V
2762	4822 124 40769	4,7µF 20% 100V
2763	4822 124 40433	47µF 20% 25V
2765	4822 124 40433	47µF 20% 25V
2769	5322 122 34099	470pF 10% 63V
2770	5322 122 34099	470pF 10% 63V
2780	4822 124 81151	22µF 50V
2781	4822 122 33177	10nF 20% 50V
2782	5322 126 10223	4,7nF 10% 63V
2784	4822 121 51305	15nF 10% 50V
2785	4822 124 40242	1µF 20% 63V
2786	5322 122 32531	100pF 5% 50V
2787	4822 126 12105	33nF 5% 50V

RESISTORS

3601	4822 117 11449	2k2 1% 0,1W
3602	4822 051 20273	27k 5% 0,1W
3603	4822 117 11449	2k2 1% 0,1W
3604	4822 117 11148	56k 1% 0,1W
3605	4822 117 11449	2k2 1% 0,1W
3606	4822 051 20124	120k 5% 0,1W
3607	4822 116 52256	2k2 5% 0,5W
3608	4822 051 20273	27k 5% 0,1W
3609	4822 116 52256	2k2 5% 0,5W
3610	4822 051 20124	120k 5% 0,1W
3611	4822 116 52256	2k2 5% 0,5W
3612	4822 117 11148	56k 1% 0,1W
3613	4822 051 20273	27k 5% 0,1W
3614	4822 051 20273	27k 5% 0,1W
3616	4822 117 10833	10k 1% 0,1W
3618	4822 117 10833	10k 1% 0,1W
3620	5322 100 11542	Trimmer 4k7 30% 0,1W
3623	4822 051 20104	100k 5% 0,1W
3624	4822 051 20104	100k 5% 0,1W
3625	4822 051 10102	1k 2% 0,25W
3626	4822 051 10102	1k 2% 0,25W
3628	4822 051 20104	100k 5% 0,1W
3630	4822 051 20471	470R 5% 0,1W
3672	4822 051 20472	4k7 5% 0,1W
3674	4822 116 52283	4k7 5% 0,5W
3676	4822 117 10834	47k 1% 0,1W
3678	4822 117 10834	47k 1% 0,1W
3679	4822 117 10834	47k 1% 0,1W
3680	4822 117 10834	47k 1% 0,1W
3685	4822 116 52234	100k 5% 0,5W
3686	4822 051 20104	100k 5% 0,1W
3688	4822 051 20681	680R 5% 0,1W
3701	4822 117 11503	220R 1% 0.1W
3702	4822 117 11503	220R 1% 0.1W
3703	4822 117 11503	220R 1% 0.1W
3704	4822 117 11503	220R 1% 0.1W
3705	4822 117 11503	220R 1% 0.1W
3706	4822 117 11503	220R 1% 0.1W

3707	4822 051 20101	100R 5% 0,1W
3708	4822 051 20101	100R 5% 0,1W
3709	4822 051 20688	6R8 5% 0,1W
3710	4822 051 20688	6R8 5% 0,1W
3711	4822 051 20154	150k 5% 0,1W
3712	4822 051 20154	150k 5% 0,1W
3713	4822 051 20109	10R 5% 0,1W
3714	4822 051 20109	10R 5% 0,1W
3715	4822 051 20182	1k8 5% 0,1W
3716	4822 051 20182	1k8 5% 0,1W
3717	4822 117 11449	2k2 1% 0,1W
3718	4822 117 11449	2k2 1% 0,1W
3719	4822 051 20472	4k7 5% 0,1W
3720	4822 051 20472	4k7 5% 0,1W
3721	4822 051 20562	5k6 5% 0,1W
3722	4822 051 20562	5k6 5% 0,1W
3723	4822 117 11383	12k 1% 0,1W
3724	4822 117 11383	12k 1% 0,1W
3725	4822 051 20109	10R 5% 0,1W
3726	4822 051 20109	10R 5% 0,1W
3727	4822 051 20562	5k6 5% 0,1W
3728	4822 051 20562	5k6 5% 0,1W
3729	4822 117 12955	2k7 1% 0,1W
3730	4822 117 12955	2k7 1% 0,1W
3731	4822 117 11507	6k8 1% 0,1W
3732	4822 117 11507	6k8 1% 0,1W
3733	4822 051 10102	1k 2% 0,25W
3734	4822 051 10102	1k 2% 0,25W
3735	4822 051 20223	22k 5% 0,1W
3736	4822 051 20223	22k 5% 0,1W
3741	4822 117 11449	2k2 1% 0,1W
3742	4822 117 11449	2k2 1% 0,1W
3743	4822 051 20122	1k2 5% 0,1W
3744	4822 051 20122	1k2 5% 0,1W
3745	4822 051 20332	3k3 5% 0,1W
3746	4822 051 20332	3k3 5% 0,1W
3748	4822 117 11449	2k2 1% 0,1W
3749	4822 117 10834	47k 1% 0,1W
3751	4822 117 10833	10k 1% 0,1W
3752	4822 051 20104	100k 5% 0,1W
3753	4822 051 20104	100k 5% 0,1W
3754	4822 051 20105	1M 5% 0,1W
3755	4822 051 20105	1M 5% 0,1W
3756	4822 117 13579	220k 1% 0,1W
3757	4822 117 13579	220k 1% 0,1W
3758	4822 117 10833	10k 1% 0,1W
3759	4822 117 10833	10k 1% 0,1W
3760	4822 051 20121	120R 5% 0,1W
3761	4822 116 83864	10k 5% 0,5W
3762	4822 117 11454	820R 1% 0,1W
3763	4822 051 20154	150k 5% 0,1W
3764	4822 116 83872	220R 5% 0,5W
3765	4822 051 20393	39k 5% 0,1W
3766	4822 051 20475	4M7 5% 0,1W
3767	4822 051 20475	4M7 5% 0,1W
3768	4822 117 10833	10k 1% 0,1W
3769	4822 117 11507	6k8 1% 0,1W
3770	4822 117 11139	1k5 1% 0,1W
3771	4822 051 20122	1k2 5% 0,1W
3772	4822 051 20822	8k2 5% 0,1W
3773	5322 100 11542	Trimmer 4k7 30% 0,1W
3774	4822 051 20822	8k2 5% 0,1W
3775	4822 051 20478	4R7 5% 0,1W
3776	4822 117 11507	6k8 1% 0,1W
3777	4822 117 10353	150R 1% 0,1W
3778	4822 052 10688 △	6R8 5% 0.33W
3779	4822 051 20334	330k 5% 0,1W
3780	4822 051 20105	1M 5% 0,1W
3781	4822 051 20475	4M7 5% 0.1W
3784	4822 051 10102	1k 2% 0,25W
3786	4822 051 20223	22k 5% 0,1W
3787	4822 051 20105	1M 5% 0,1W
3788	4822 051 20105	1M 5% 0,1W
3789	4822 117 10834	47k 1% 0,1W
4701	4822 051 20008	0R Jumper 0805
4702	4822 051 20008	0R Jumper 0805
4703	4822 051 20008	0R Jumper 0805
4704	4822 051 20008	0R Jumper 0805
4705	4822 051 20008	0R Jumper 0805
4706	4822 051 20008	0R Jumper 0805
4707	4822 051 20008	0R Jumper 0805
4708	4822 051 20008	0R Jumper 0805
4709	4822 051 20008	0R Jumper 0805
4710	4822 051 20008	0R Jumper 0805
4711	4822 051 20008	0R Jumper 0805
4712	4822 051 20008	0R Jumper 0805
4713	4822 051 20008	0R Jumper 0805
4714	4822 051 20008	0R Jumper 0805
4715	4822 051 20008	0R Jumper 0805
4716	4822 051 20008	0R Jumper 0805
4717	4822 051 20008	0R Jumper 0805
4718	4822 051 20008	0R Jumper 0805
4719	4822 051 20008	0R Jumper 0805
4720	4822 051 20008	0R Jumper 0805
4721	4822 051 20008	0R Jumper 0805
4722	4822 051 20008	0R Jumper 0805
4723	4822 051 20008	0R Jumper 0805
4724	4822 051 20008	0R Jumper 0805
4725	4822 051 20008	0R Jumper 0805
4726	4822 051 20008	0R Jumper 0805
4727	4822 051 20008	0R Jumper 0805
4728	4822 051 20008	0R Jumper 0805
4729	4822 051 20008	0R Jumper 0805
4730	4822 051 20008	0R Jumper 0805

ELECTRICAL PARTS LIST - ETF5.. NON-DOLBY BOARD

RESISTORS

4731	4822 051 20008	0R Jumper 0805
4732	4822 051 20008	0R Jumper 0805
4733	4822 051 20008	0R Jumper 0805
4734	4822 051 20008	0R Jumper 0805
4735	4822 051 20008	0R Jumper 0805
4736	4822 051 20008	0R Jumper 0805
4737	4822 051 20008	0R Jumper 0805
4738	4822 051 20008	0R Jumper 0805
4739	4822 051 20008	0R Jumper 0805
4740	4822 051 20008	0R Jumper 0805
4743	4822 051 20008	0R Jumper 0805
4785	4822 051 20008	0R Jumper 0805
4790	4822 051 20008	0R Jumper 0805
4794	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5701	4822 157 11477	Coil 2,2µH 5%
5703	4822 156 20946	Osc. Coil 100kHz

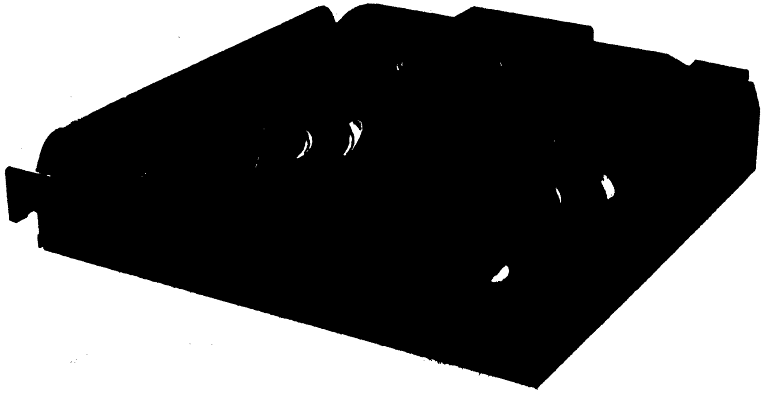
DIODES

6611	4822 130 31878	1N4003G
6612	4822 130 31878	1N4003G
6614	4822 130 30621	1N4148
6770	4822 130 30621	1N4148
6771	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-B8V2
6778	4822 130 30621	1N4148
6782	4822 130 30621	1N4148
6785	4822 130 30621	1N4148
6786	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7610	5322 209 11306	HEF4094BT
7612	5322 130 60845	BC807-25
7613	5322 130 60845	BC807-25
7614	5322 130 60845	BC807-25
7616	5322 130 60508	BC857B
7618	4822 130 60511	BC847B
7619	4822 130 60511	BC847B
7620	4822 130 60511	BC847B
7622	4822 130 60511	BC847B
7623	4822 130 60511	BC847B
7624	4822 130 60511	BC847B
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7780	4822 130 60511	BC847B
7781	4822 130 60511	BC847B
7782	4822 130 44568	BC557B
7783	4822 130 60511	BC847B
7784	5322 130 60508	BC857B
7786	4822 130 63494	J111
7787	4822 130 60511	BC847B
7791	4822 130 60511	BC847B
7792	4822 130 60511	BC847B

Note: Only the parts mentioned in this list are normal service spare parts.



3CDC 99 Module

(3 Disc Carrousel Changer)

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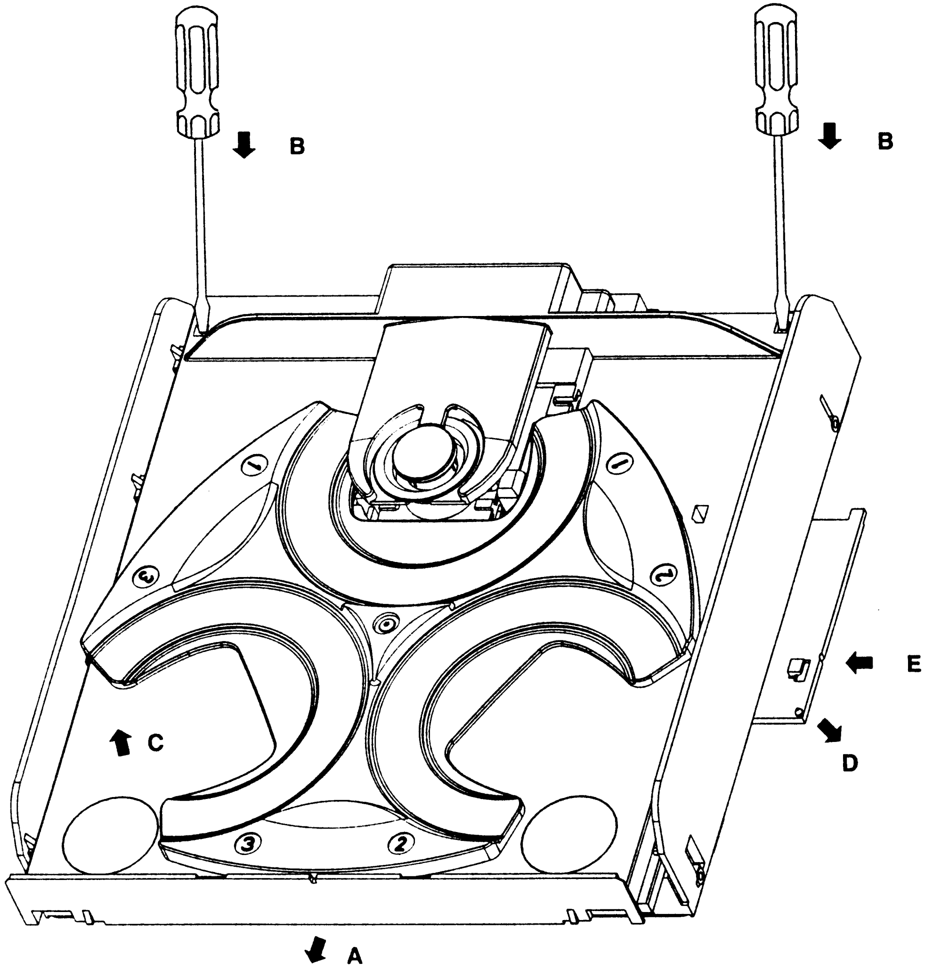
Demounting Hints



Demounting of Drawer

→ **A** Pull drawer outwards
→ **B** Unlock drawer with screwdriver
→ **C** Lift drawer to demount from chassis

Demounting of Flex Plate

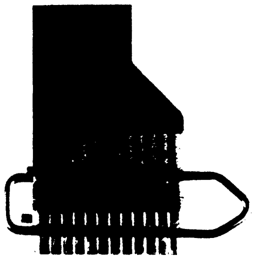
→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

Servicing Hints

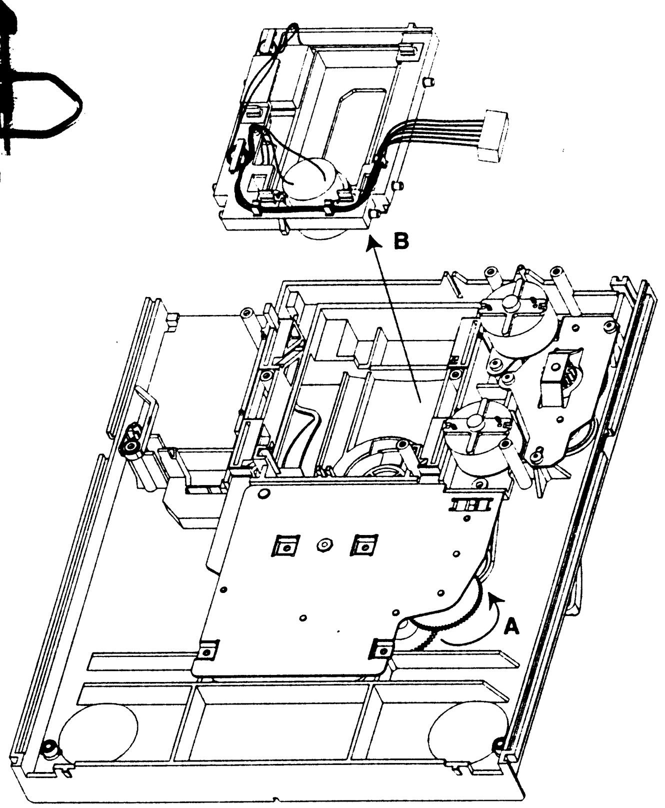
Replacement of CD Drive

See also exploded view of changer mechanism.

1. Demount printed circuit board: remove 5 screws.
2. Disconnect flexfoil and JST connector of CD drive from Printed circuit board. Shortcircuit the flexfoil with a paperclip to protect the laser against ESD.
3. Remove 2 screws (pos 107,108) and demount CD drive lockings (pos 105,106).
4. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
5. Demount CD drive support (pos 95) Ⓑ.
6. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.



CD drive flex foil

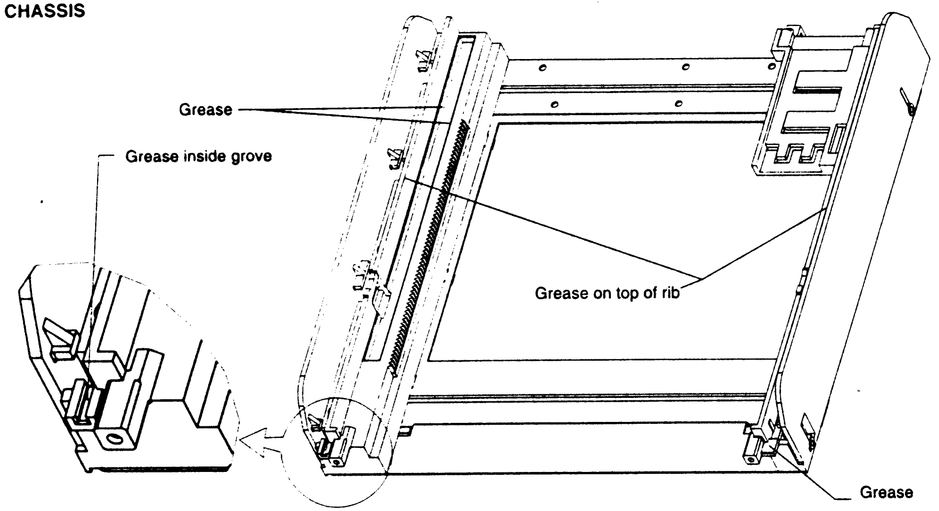


Mounting of Carrousel

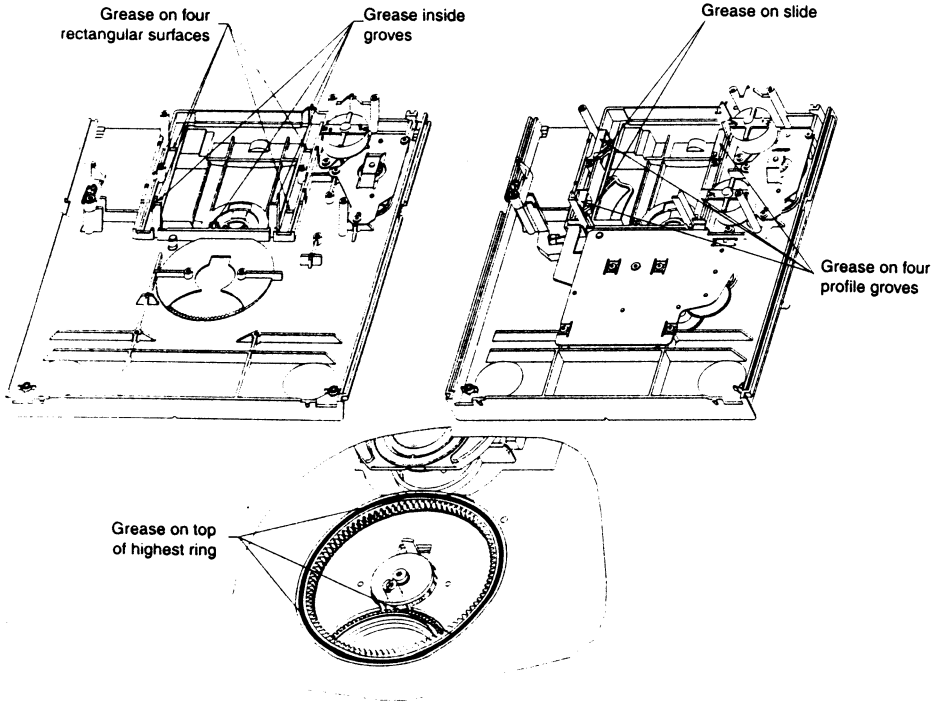
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carrousel (pos 115) so that disc is positioned right on turntable. Carrousel position number doesn't matter.

Lubrication Instructions

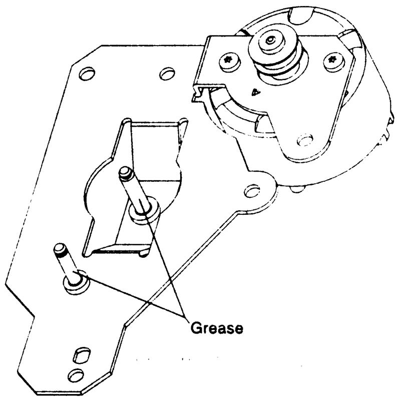
CHASSIS


Grease
Grease inside grove
Grease on top of rib
Grease

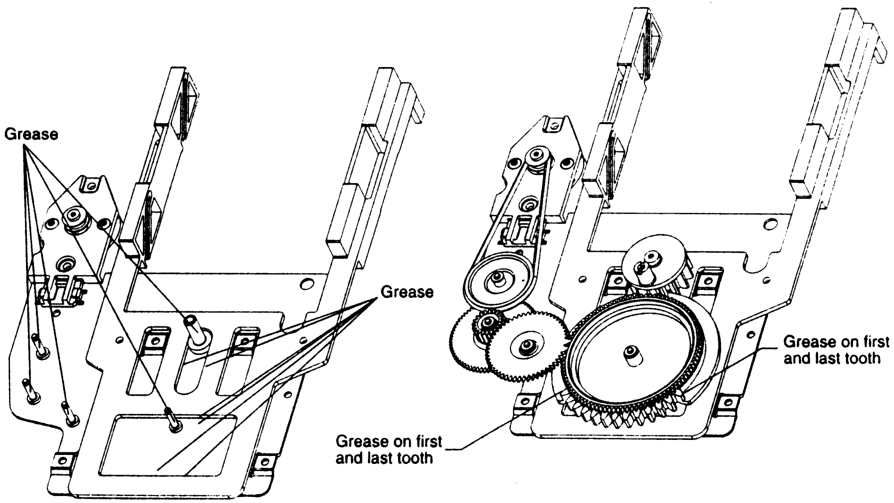
DRAWER


Grease on four rectangular surfaces
Grease inside groves
Grease on slide
Grease on four profile groves
Grease on top of highest ring

DRAWER MECHANISM



DISC CHANGE MECHANISM


Grease
Grease
Grease on first and last tooth
Grease on first and last tooth

Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT´S WHY, BESIDES THE SAFETY MEASURES LIKE
- *SWITCH OFF POWER SUPPLY*
- *ESD PROTECTION*

ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CDM mechanism:
1. Disconnect old CD drive flexfoil from printed board
2. Connect paperclip to CD drive flexfoil to short-circuit flexfoil (fig.1)
3. Short-circuit printed board with **brass-sheet (4822 321 11197)** plugged into the flexfoil connector (fig.2)
4. Remove old CD drive mechanism
5. Position new CD mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CD drive
8. Connect new flexfoil to print connector (fig.3)

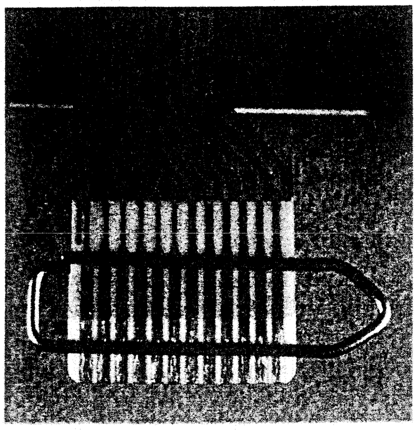


fig.1

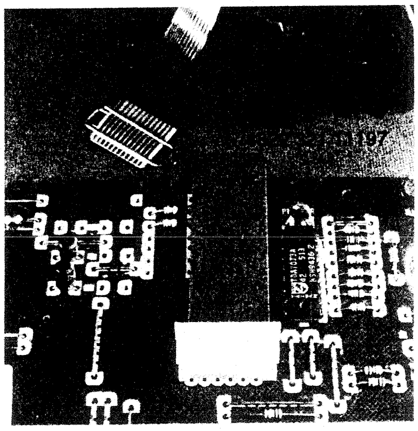


fig.2

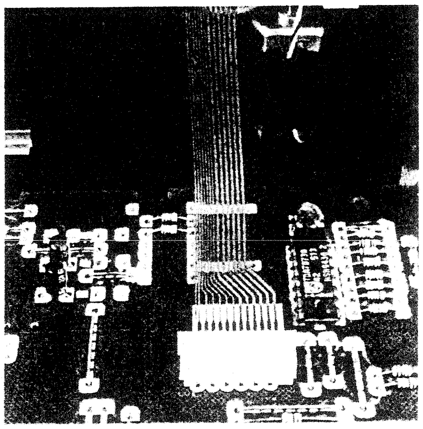
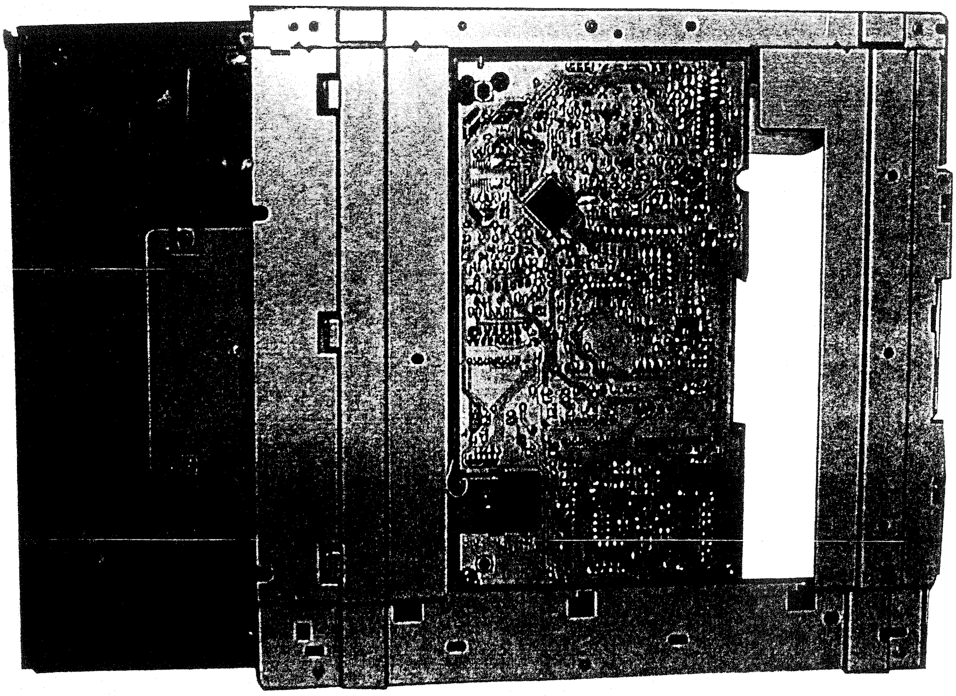
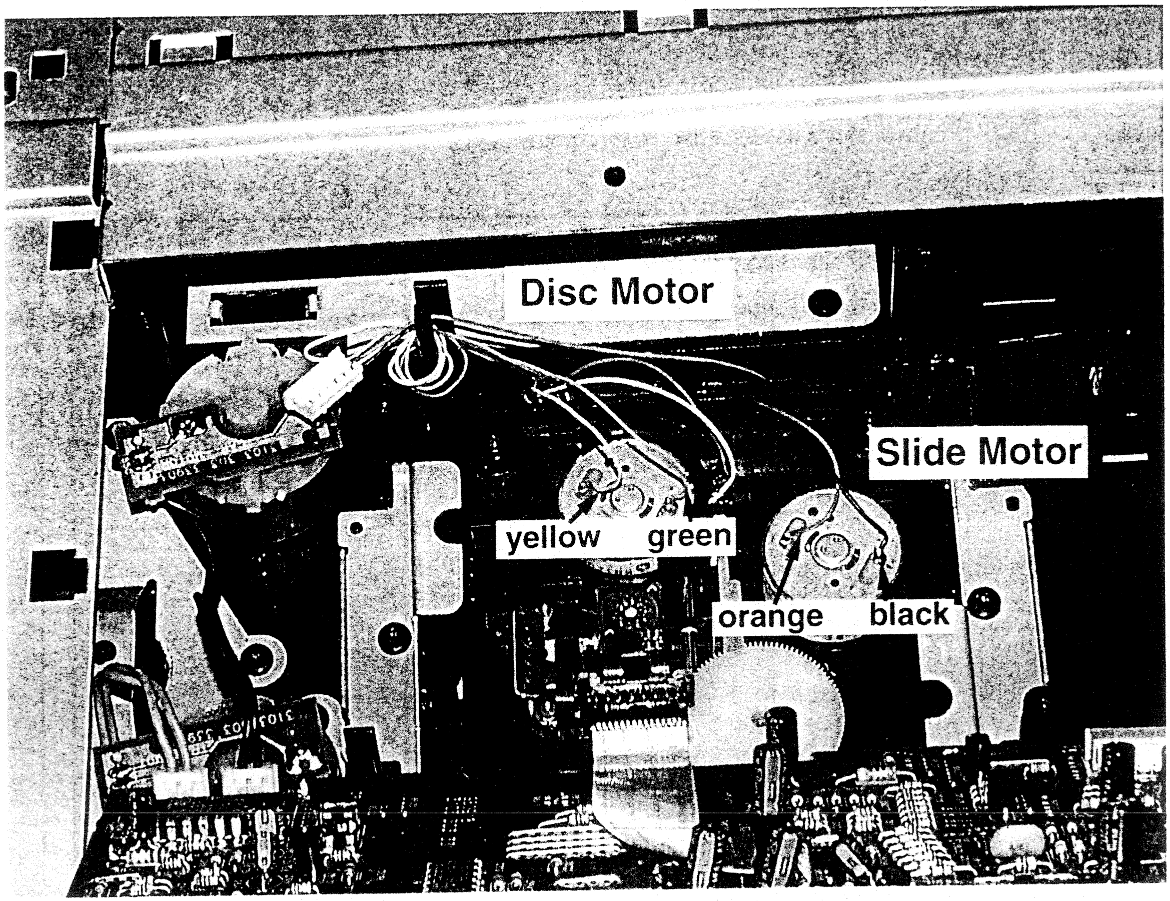


fig.3

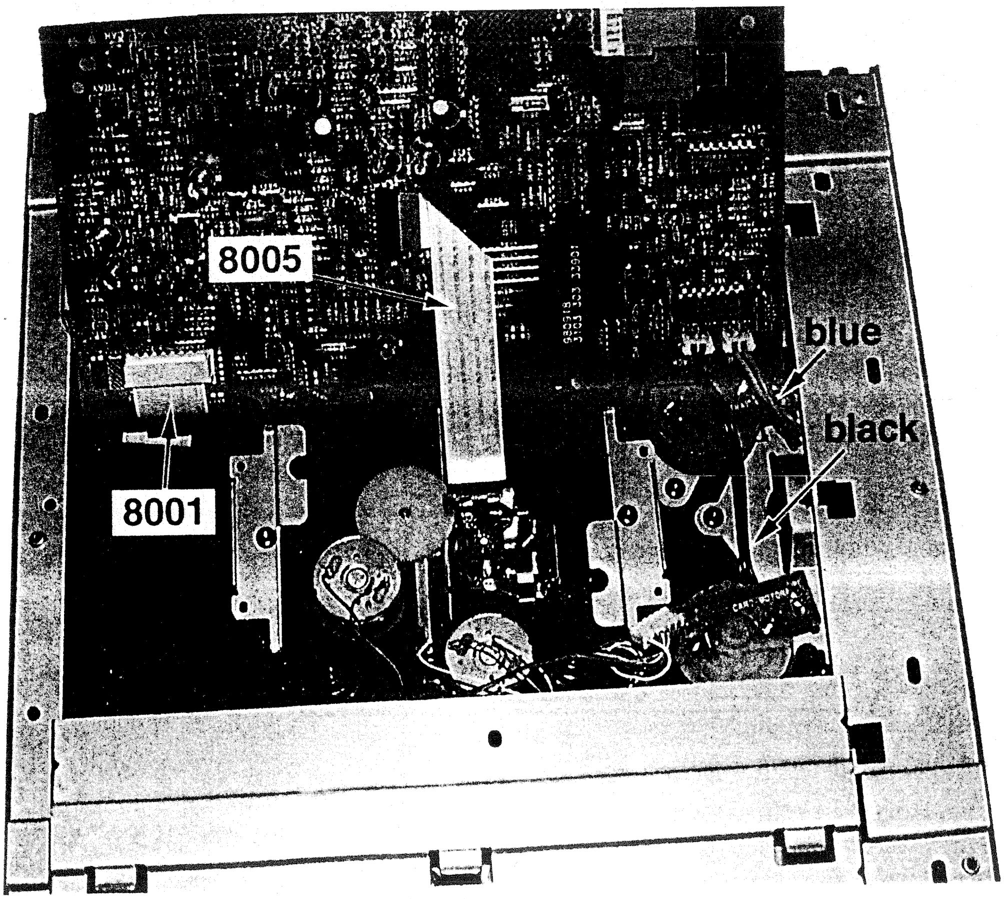
Service Position



Wiring of CD Drive

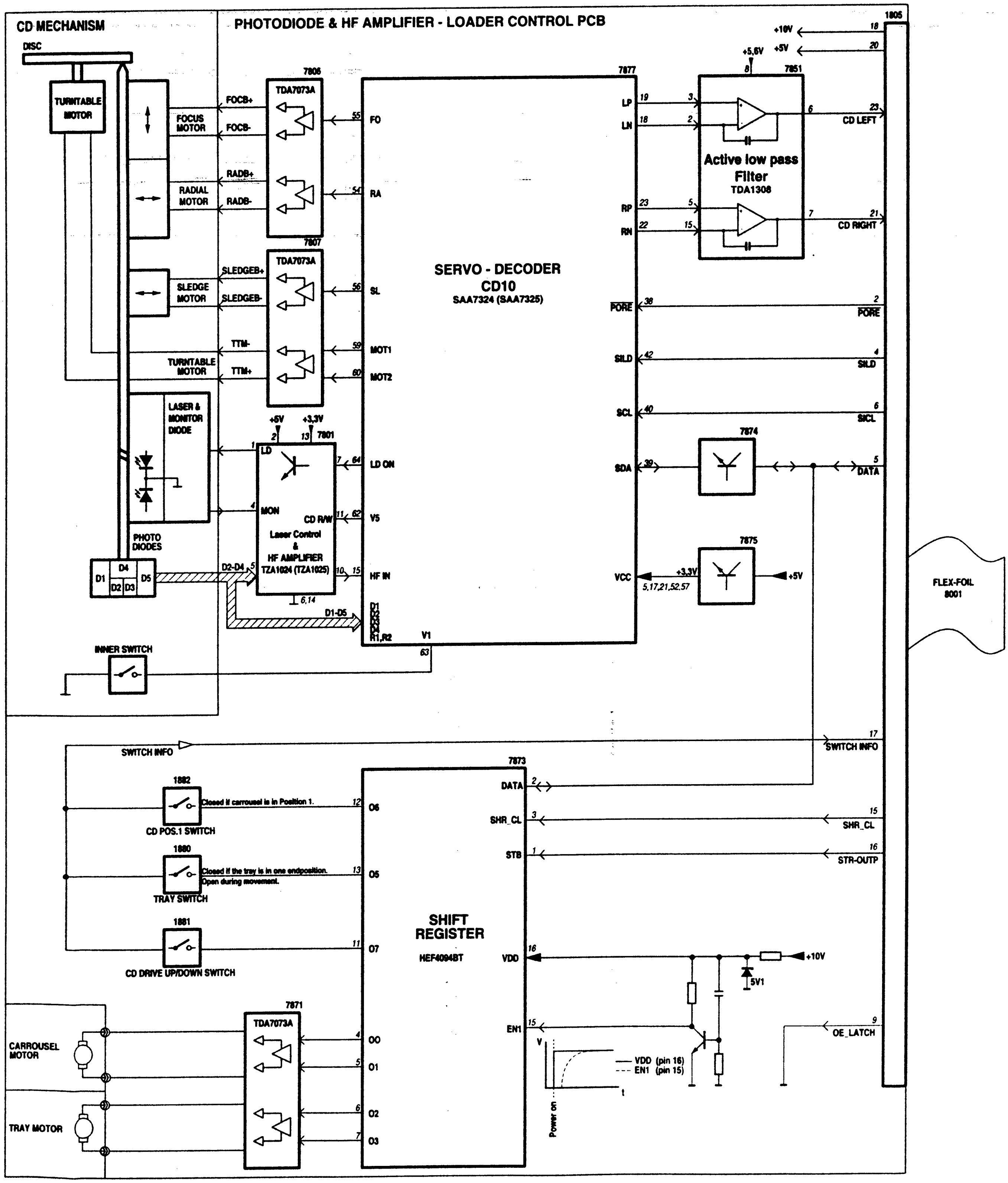

Disc Motor
Slide Motor
yellow
green
orange
black

Pict. 1


8005
blue
black
8001

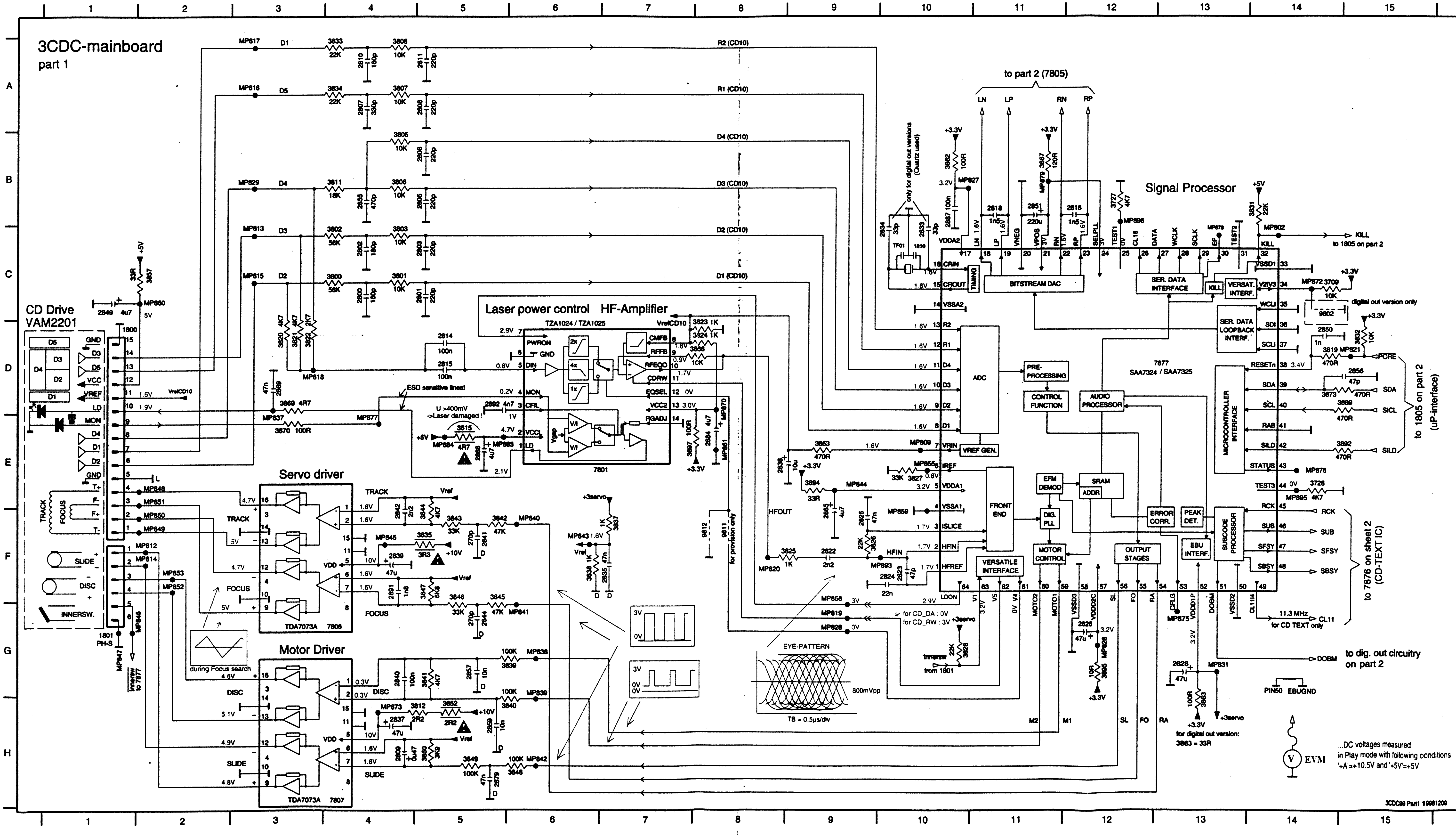
Pict. 2

Blockdiagram

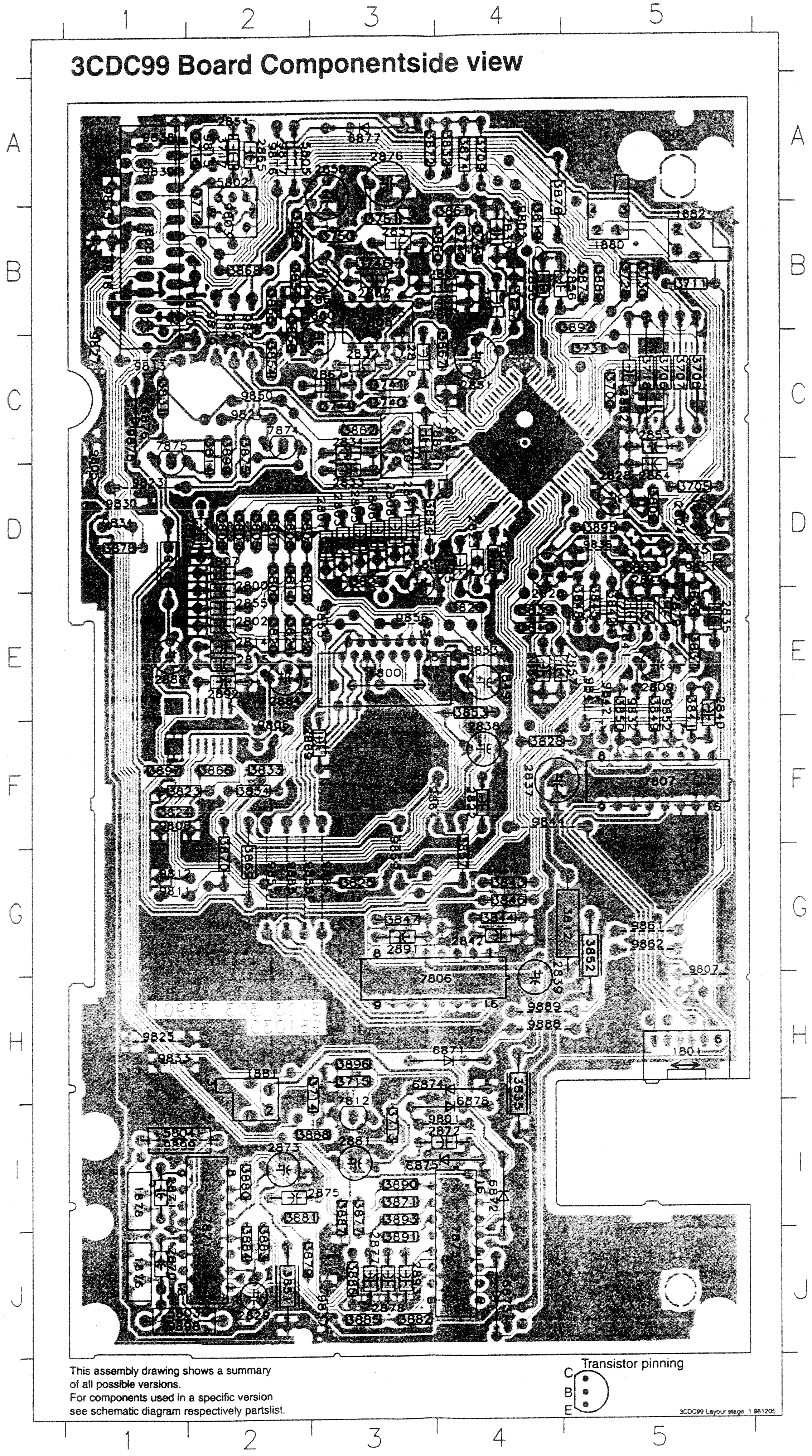

CD MECHANISM
PHOTODIODE & HF AMPLIFIER - LOADER CONTROL PCB
DISC
TURNTABLE MOTOR
FOCUS MOTOR
FOCB+
FOCB-
RADIAL MOTOR
RADB+
RADB-
SLEDGE MOTOR
SLEDGEB+
SLEDGEB-
TURNTABLE MOTOR
TTM-
TTM+
LASER & MONITOR DIODE
PHOTO DIODES
D1
D2
D3
D4
D5
D2-D4
D1-D5
INNER SWITCH
7806
TDA7073A
7807
TDA7073A
7801
+5V
+3,3V
LD
MON
CD R/W
Laser Control & HF AMPLIFIER
TZA1024 (TZA1025)
6,14
7877
SERVO - DECODER
CD10
SAA7324 (SAA7325)
FO
RA
SL
MOT1
MOT2
LD ON
V5
HF IN
D1 D2 D3 D4 R1,R2
V1
63
LP
LN
RP
RN
PORE
SILD
SCL
SDA
VCC
+3,3V
5,17,21,52,57
7851
+5,6V
+10V
+5V
Active low pass Filter
TDA1308
CD LEFT
CD RIGHT
7874
7875
DATA
1805
FLEX-FOIL
8001
SWITCH INFO
1882
Closed if carrousel is in Position 1.
CD POS.1 SWITCH
1880
Closed if the tray is in one endposition.
Open during movement.
TRAY SWITCH
1881
CD DRIVE UP/DOWN SWITCH
7873
SHIFT REGISTER
HEF4094BT
O6
O5
O7
DATA
SHR_CL
STB
VDD
EN1
STR-OUTP
OE_LATCH
5V1
V
t
Power on
VDD (pin 16)
EN1 (pin 15)
7871
TDA7073A
CARROUSEL MOTOR
TRAY MOTOR
O0
O1
O2
O3

Blockdiagram 3CDC99 19981202

1800 D2	2805 B5	2814 D5	2825 F9	2838 E8	2850 D14	2879 H5	2892 D5	3803 C4	3815 E5	3825 F9	3834 A4	3842 F5	3849 H5	3866 D8	3894 E9	9802 C14	
1801 G1	2806 B5	2815 D5	2826 G12	2839 F4	2851 B11	2880 D8	3709 C14	3805 B4	3819 D14	3826 F9	3835 F5	3843 F5	3850 H5	3867 B11	3895 G12	9811 F8	
1810 C10	2807 A4	2816 B12	2828 G13	2840 G4	2855 B4	2884 E8	3727 B12	3806 B4	3820 D3	3827 E10	3837 F7	3844 F5	3852 H5	3869 D3	3897 E7	9812 F8	
2800 C4	2808 A5	2818 B11	2833 C10	2841 F5	2856 D15	2885 F9	3728 E14	3807 A4	3821 D3	3828 G10	3838 F6	3845 F5	3853 E9	3870 E3	7801 E7		
2801 C5	2809 H4	2822 F9	2834 C10	2842 F4	2857 G5	2887 B10	3800 C4	3808 A4	3822 D3	3831 B14	3839 G6	3846 F5	3857 C2	3873 D14	7806 G4		
2802 C4	2810 A4	2823 F10	2835 F7	2844 G5	2859 H5	2888 E5	3801 C4	3811 B4	3823 D8	3832 D15	3840 H6	3847 F5	3862 B10	3889 D15	7807 H4		
2803 C5	2811 A5	2824 F10	2837 H4	2849 C1	2869 D3	2891 F4	3802 C4	3812 H5	3824 D8	3833 A4	3841 G5	3848 H6	3863 H13	3892 E15	7877 D12		


3CDC-mainboard
part 1
CD Drive
VAM2201
Laser power control
HF-Amplifier
TZA1024 / TZA1025
7801
Servo driver
TDA7073A
7806
Motor Driver
TDA7073A
7807
Signal Processor
7877
SAA7324 / SAA7325
to part 2 (7805)
LN
LP
RN
RP
BITSTREAM DAC
SER. DATA INTERFACE
VERSAT. INTERF.
KILL
SER. DATA LOOPBACK INTERF.
MICROCONTROLLER INTERFACE
ADC
PRE-PROCESSING
CONTROL FUNCTION
AUDIO PROCESSOR
VREF GEN.
FRONT END
EFM DEMOD
SRAM
ADDR
DIG. PLL
MOTOR CONTROL
ERROR CORR.
PEAK DET.
OUTPUT STAGES
EBU INTERF.
SUBCODE PROCESSOR
VERSATILE INTERFACE
TIMING
KILL
to 1805 on part 2
digital out version only
to 1805 on part 2
(uP-interface)
PORE
SDA
SICL
SILD
RCK
SUB
SFSY
SBSY
to 7876 on sheet 2
(CD-TEXT IC)
11.3 MHz
CL11
for CD TEXT only
DOBM
to dig. out circuitry
on part 2
PIN50 EBUGND
only for digital out versions
(Quartz used)
ESD sensitive lines!
U >400mV
->Laser damaged !
TRACK
FOCUS
DISC
SLIDE
INNERSW.
during Focus search
innersw
to 7877
innersw
from 1801
for CD_DA : 0V
for CD_RW : 3V
HFOUT
HFIN
for provision only
EYE-PATTERN
800mVpp
TB = 0.5µs/div
+3.3V
for digital out version:
3863 = 33R
EVM
...DC voltages measured
in Play mode with following conditions
'+A'=+10.5V and '+5V'=+5V
3CDC99 Part1 19981209
A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

3CDC99 Board Componentside view

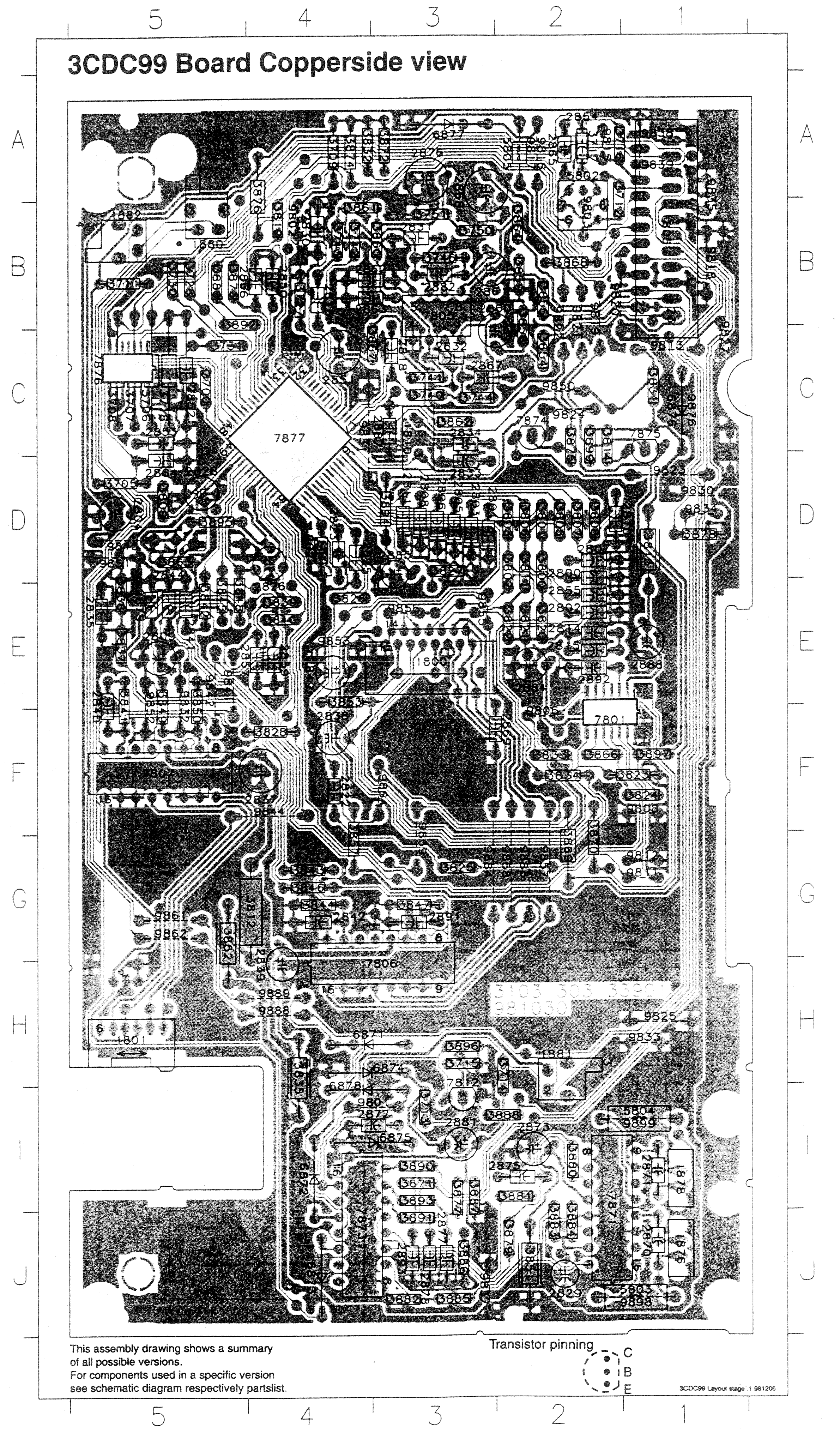


This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Mapping

1800	E3
1801	H5
1805	B1
1810	C3
1876	J1
1878	I1
1880	B5
1881	H2
1882	B5
2800	D2
2801	D3
2802	E2
2803	D3
2804	D5
2805	D3
2806	D3
2807	D2
2808	D3
2809	E5
2810	D2
2811	D3
2814	E2
2815	E2
2816	B4
2818	C3
2822	F4
2823	D4
2824	D4
2825	D4
2826	E4
2828	D5
2829	J2
2830	B4
2831	B3
2832	C3
2833	D3
2834	C3
2835	E5
2837	F4
2838	F4
2839	H4
2840	E5
2841	E5
2842	G4
2844	D5
2849	E4
2850	B4
2851	C4
2852	C5
2853	C5
2854	A2
2855	E2
2856	B5
2857	E5
2858	A3
2859	E4
2860	B3
2861	B3
2862	B4
2863	B4
2864	D5
2865	A2
2867	C3
2869	F2
2870	J1
2871	I1
2872	I4
2873	I2
2875	I3
2876	A3
2877	J3
2878	J3
2879	E5
2881	I3
2882	B3
2884	E2
2885	D3
2887	C4
2888	E1
2891	G3
2892	E2
2893	J3
3700	C5
3705	D5
3706	C5
3707	C5
3708	C5
3709	A4
3711	B5
3712	B2
3713	I3
3714	H3
3715	H3
3716	A2
3717	A2
3718	C5
3727	B4
3728	B5
3730	B5
3731	C5
3740	C3
3741	C3
3742	B4
3743	B4
3744	C3
3746	B3
3750	B3
3751	B3
3800	D2
3801	D2
3802	D2
3803	D2
3805	D2
3806	D2
3807	D2
3808	D2
3809	D5
3811	D2
3812	G5
3814	C2
3815	D1
3819	B4
3820	E2
3821	E2
3822	E2
3823	F1
3824	F1
3825	G3
3826	E4
3827	D3
3828	F4
3831	C1
3832	A4
3833	F2
3834	F2
3835	H4
3837	E5
3838	E5
3839	E4
3840	E4
3841	E5
3842	E5
3843	G4
3844	G4
3845	E5
3846	G4
3847	G3
3848	E5
3849	E5
3850	E5
3851	J2
3852	G5
3853	E4
3854	C2
3855	B2
3857	G4
3858	C2
3859	B2
3860	B4
3861	B4
3862	C3
3863	D5
3864	B2
3866	F2
3867	C4
3868	B2
3869	G2
3870	G2
3871	I3
3872	A3
3873	B5
3874	A4
3875	C2
3876	A4
3877	I3
3878	D1
3879	J2
3880	I2
3881	I2
3882	J3
3883	J2
3884	J2
3885	J3
3886	J3
3887	I3
3888	I3
3889	B5
3890	I3
3891	J3
3892	B5
3893	I3
3894	D3
3895	D5
3896	H3
3897	F1
3899	C2
5802	A2
5803	J1
5804	I1
5805	A2
6871	H4
6872	I4
6873	J4
6874	H3
6875	I3
6876	C1
6877	A3
6878	H4
7801	F1
7805	B3
7806	H3
7807	F5
7812	H3
7871	J2
7873	J4
7874	C2
7875	C1
7876	C5
7877	C4
9801	I4
9802	B4
9803	B2
9805	D1
9806	F2
9807	G5
9808	F1
9811	G1
9812	G1
9813	C1
9815	A2
9816	A2
9817	A2
9818	B1
9819	B2
9820	B2
9821	B2
9822	B2
9823	D1
9824	C2
9825	H1
9827	C1
9830	D1
9831	C4
9832	E5
9833	H1
9834	D1
9835	A1
9836	D5
9837	J3
9838	A1
9839	A1
9841	E5
9842	E5
9844	F4
9845	D5
9850	C2
9851	D5
9852	E5
9853	E4
9855	E3
9856	E3
9857	G2
9858	G2
9859	G3
9861	G5
9862	G5
9864	F3
9876	C1
9884	G3
9885	G2
9888	H4
9889	H4
9898	J1
9899	I1

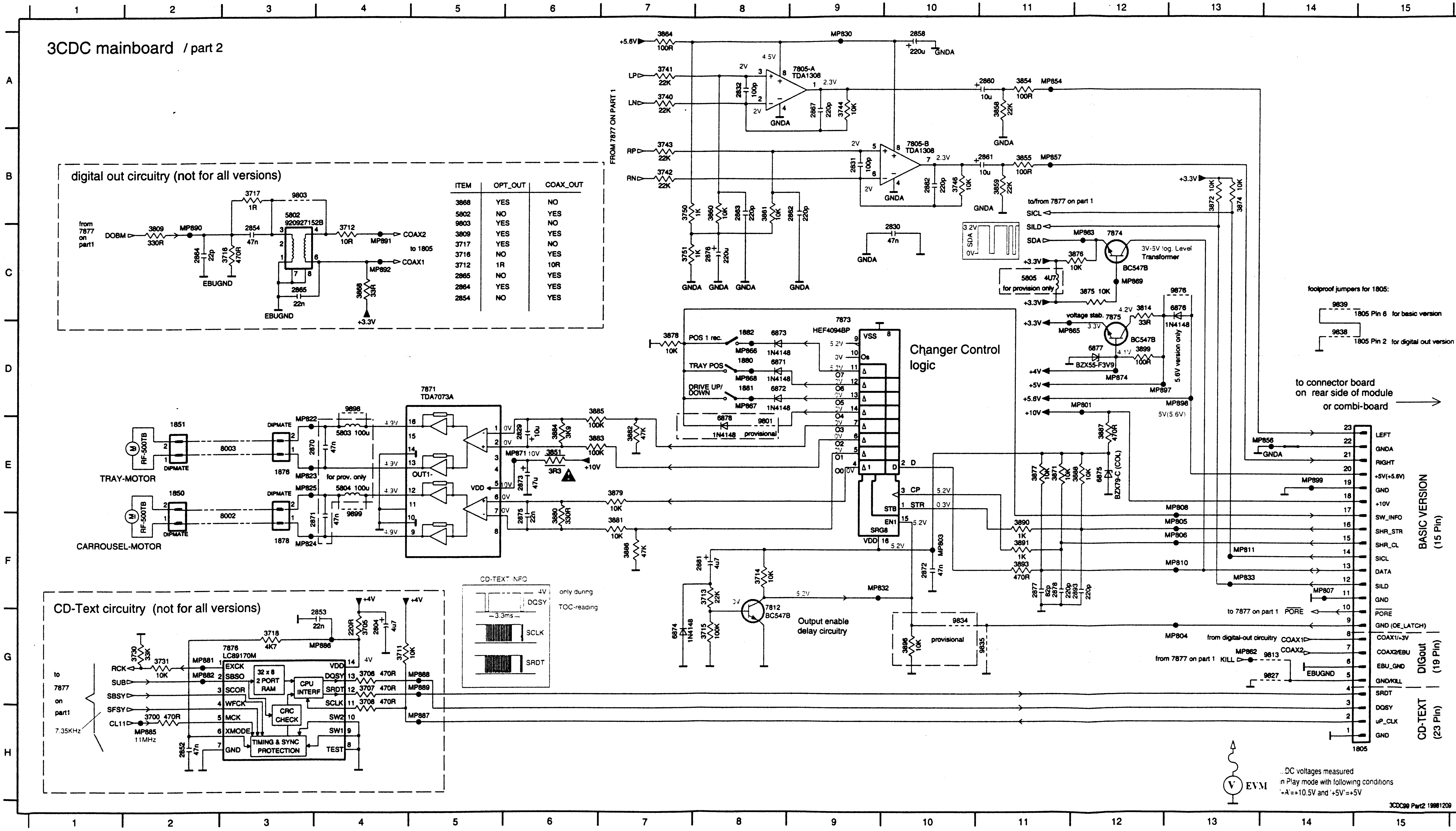
3CDC99 Board Copperside view



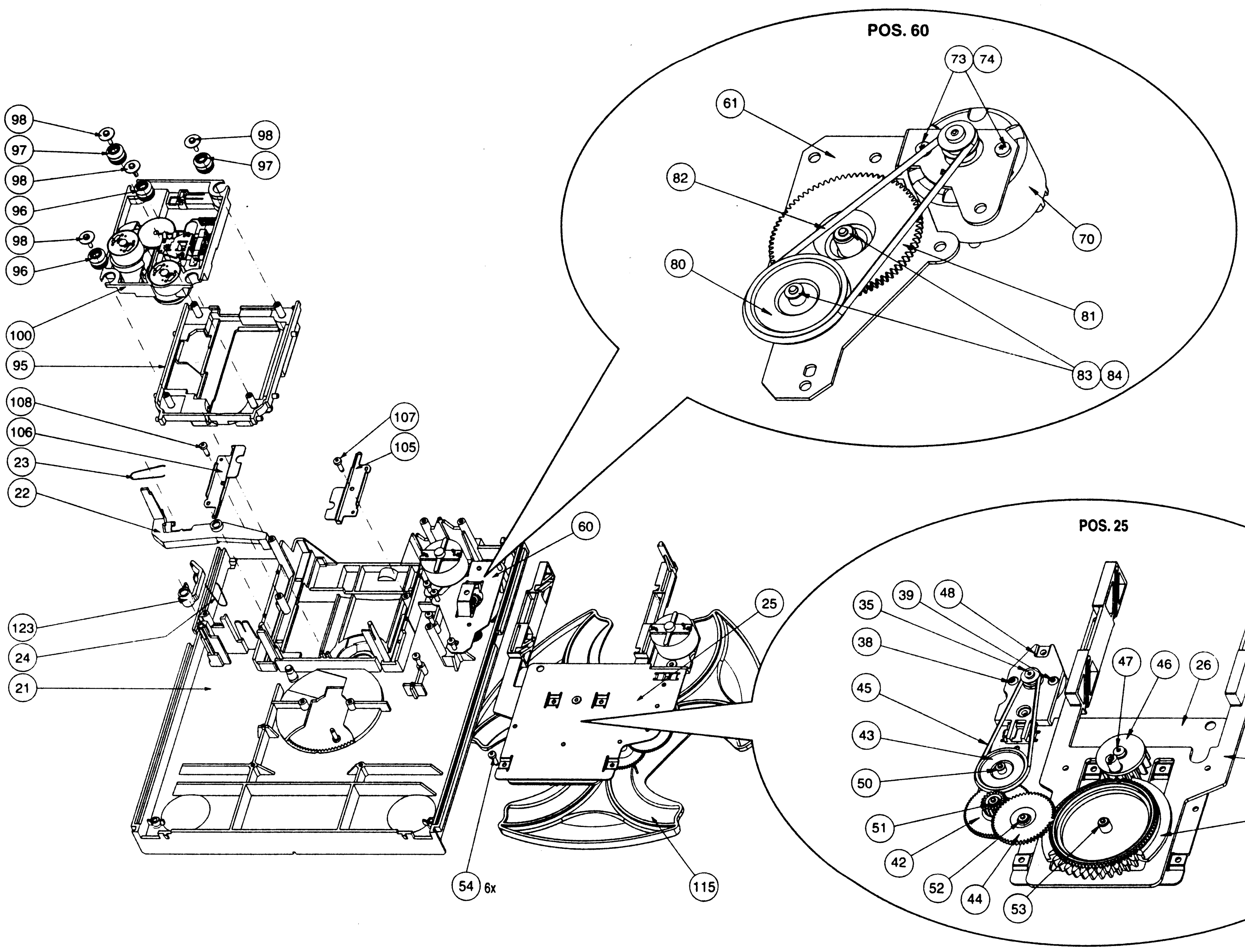
This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

1805 H14	2804 G4	2853 G4	2863 B8	2872 F10	2881 F8	3707 G4	3715 G8	3740 A7	3750 B7	3855 B11	3868 C4	3877 E11	3883 E6	3890 F11	5803 E4	6874 G7	7805-B B10	7876 G3	9835 G11
1876 E3	2829 E6	2854 C3	2864 C2	2873 E6	2882 B10	3708 H4	3716 C3	3741 A7	3751 C7	3858 A11	3871 E11	3878 D7	3884 E6	3891 F11	5804 E4	6875 E12	7812 G8	9801 E8	9838 D14
1878 F3	2830 C10	2858 A10	2865 C3	2875 F6	2893 F12	3711 G4	3717 B3	3742 B7	3809 C2	3859 B11	3872 B13	3879 E7	3885 D6	3893 F11	5805 C11	6876 C13	7871 D5	9803 B3	9839 C14
1880 D8	2831 B9	2860 A11	2867 A9	2876 C8	3700 H2	3712 C4	3718 G3	3743 B7	3814 C12	3860 B8	3874 B13	3880 F6	3886 F7	3896 G10	6871 D8	6877 D12	7873 D9	9813 G14	9876 C13
1881 D8	2832 A8	2861 B11	2870 E3	2877 F11	3705 G4	3713 F8	3730 G2	3744 A9	3851 E6	3861 B8	3875 C12	3881 F7	3887 E12	3899 D12	6872 D8	6878 E8	7874 C12	9827 G14	9898 D4
1882 D8	2852 H2	2862 B8	2871 F4	2878 F11	3706 G4	3714 F8	3731 G2	3746 B10	3854 A11	3864 A7	3876 C12	3882 E7	3888 E12	5802 B3	6873 D8	7805-A A9	7875 D12	9834 G10	9899 E4

3CDC mainboard / part 2


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
digital out circuitry (not for all versions)
from 7877 on part1
DOBM
3809 330R
MP890
3717 1R
9803
2854 47n
5802 920927152B
3712 10R
MP891
COAX2
to 1805
COAX1
MP892
2864 22p
3716 470R
2865 22n
3868 33R
EBUGND
+3.3V
FROM 7877 ON PART 1
+5.6V
3864 100R
MP830
2858 220u
GNDA
LP
3741 22K
LN
3740 22K
7805-A TDA1308
2832 100p
2867 220p
3744 10K
2860 10u
3854 100R
MP854
3858 22K
RP
3743 22K
RN
3742 22K
7805-B TDA1308
2831 100p
2882 220p
3746 10K
2861 10u
3855 100R
MP857
3859 22K
3750 1K
3860 10K
2863 220p
3861 10K
2862 220p
3751 1K
2876 220u
2830 47n
to/from 7877 on part 1
SICL
SILD
SDA
MP863
7874
3V-5V log. Level Transformer
BC547B
3876 10K
MP869
5805 4U7 for provision only
3875 10K
3872 10K
3874 10K
9876
6876 1N4148
3814 33R
voltage stab. 7875
MP865
BC547B
6877 BZX55-F3V9
3899 100R
MP874
5.6V version only
+4V
+5V
+5.6V
+10V
MP897
MP801
MP896 5V(5.6V)
foolproof jumpers for 1805:
9839 1805 Pin 6 for basic version
9838 1805 Pin 2 for digital out version
to connector board on rear side of module or combi-board
7873 HEF4094BP
3878 10K
POS 1 rec.
1882
6873 1N4148
MP866
TRAY POS
1880
6871 1N4148
MP868
DRIVE UP/ DOWN
1881
6872 1N4148
MP867
6878 1N4148
9801 provisional
Changer Control logic
SRG8
VSS
VDD
CP
STB
STR
EN1
7871 TDA7073A
OUT1-
VDD
9898
5803 100u
5804 100u
9899
MP822
MP823
MP825
MP824
2870 47n
2871 47n
for prov. only
1851
1850
8003
8002
RF-500TB
DIPMATE
1876
1878
TRAY-MOTOR
CARROUSEL-MOTOR
2829 10u
3884 3K9
3885 100K
3882 47K
3883 100K
MP871
3851 3R3
+10V
2873 47u
3879 10K
2875 22n
3880 330R
3881 10K
3886 47K
2881 4u7
3714 10K
3713 22K
7812 BC547B
MP832
6874 1N4148
3715 100K
Output enable delay circuitry
2872 47n
MP803
9834
3896 10K
provisional
9835
3887 470R
6875 BZX79-C (COL)
3877 1K
3871 10K
3888 10K
3890 1K
3891 1K
3893 470R
2877 82p
2878 220p
2893 220p
MP808
MP805
MP806
MP811
MP810
MP833
MP856
MP899
MP807
MP804
to 7877 on part 1 PORE
from digital-out circuitry COAX1
MP862 9813 COAX2
from 7877 on part 1 KILL
9827
EBUGND
LEFT
GNDA
RIGHT
+5V(+5.6V)
GND
+10V
SW_INFO
SHR_STR
SHR_CL
SICL
DATA
SILD
GND
PORE
GND (OE_LATCH)
COAX1/+3V
COAX2/EBU
EBU_GND
GND/KILL
SRDT
DQSY
uP_CLK
GND
1805
BASIC VERSION (15 Pin)
DIGout (19 Pin)
CD-TEXT (23 Pin)
CD-TEXT INFO
DQSY
3.3ms
SCLK
SRDT
only during TOC-reading
CD-Text circuitry (not for all versions)
to 7877 on part1
RCK
SUB
SBSY
SFSY
CL11
7.35KHz
3730 33K
3731 10K
MP881
MP882
3718 4K7
2853 22n
7876 LC89170M
EXCK
SBSO
SCOR
WFCK
MCK
XMODE
GND
32 x 8 2 PORT RAM
CPU INTERF
CRC CHECK
TIMING & SYNC PROTECTION
VDD
DQSY
SRDT
SCLK
SW2
SW1
TEST
MP886
3705 220R
2804 4u7
3711 10K
3706 470R
3707 470R
3708 470R
MP888
MP889
MP887
3700 470R
MP885 11MHz
2852 47n
+4V
DC voltages measured in Play mode with following conditions '+A'=+10.5V and '+5V'=+5V
EVM
3CDC99 Part2 19981209

ITEM	OPT_OUT	COAX_OUT
3868	YES	NO
5802	NO	YES
9803	YES	NO
3809	YES	YES
3717	YES	NO
3716	NO	YES
3712	1R	10R
2865	NO	YES
2864	YES	YES
2854	NO	YES


POS. 60
73
74
61
82
70
80
81
83
84
98
97
98
98
97
96
98
96
100
95
108
106
23
22
107
105
60
123
24
21
25
54 6x
115
POS. 25
35
39
48
38
45
43
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51
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52
44
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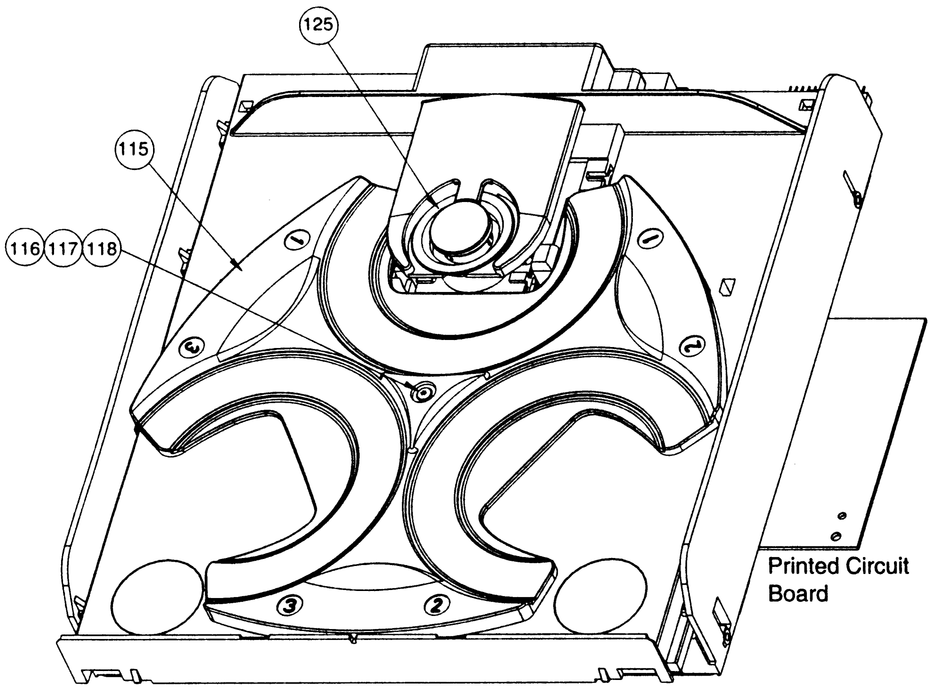
40
41

CS 53 195

10-13

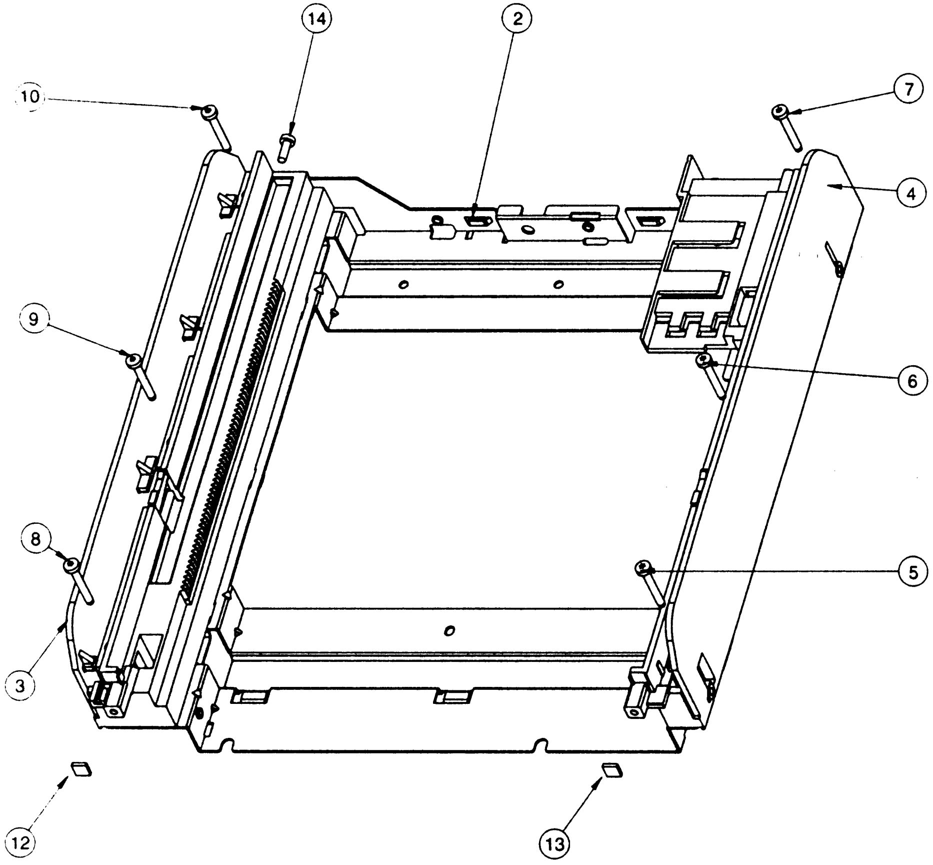

125
115
116
117
118
Printed Circuit Board
1
2
3

MECHANICAL PARTSLIST 3CDC-99 MODULE

	4822 390 10136	POLYLUB GLY801 (GREASE)	43	4822 528 10937	PULLEY
3	4822 463 11008	GUIDE LEFT	44	4822 522 10493	IDLER WHEEL
4	4822 463 11009	GUIDE RIGHT	45	4822 358 10115	BELT
21	4822 441 11615	DRAWER	46	4822 466 10735	ECCENTRIC GEAR WHEEL
22	4822 402 10088	BRACKET TUMBLER	50	4822 532 12364	WASHER
38	4822 502 12548	SCREW M2,6X3,5	51	4822 532 12364	WASHER
39	4822 502 12548	SCREW M2,6X3,5	52	4822 532 12364	WASHER
40	4822 463 11011	SLIDE	53	4822 532 12364	WASHER
41	4822 522 10509	CONTROL DISC	35	4822 361 10753	CARROUSEL MOTOR
42	4822 522 10492	GEAR WHEEL	70	4822 361 10753	CARROUSEL MOTOR

continued on next page

CS 53 196



MECHANICAL PARTSLIST 3CDC-99 MODULE

73	4822 502 12548	SCREW M2,6X3,5
74	4822 502 12548	SCREW M2,6X3,5
80	4822 528 10937	PULLEY
81	4822 522 10494	GEAR DRAWER
82	4822 358 10115	BELT
83	4822 532 12364	WASHER
84	4822 532 12364	WASHER
95	4822 404 10895	SUPPORT
96	4822 529 10431	SUSPENSION
97	4822 529 10431	SUSPENSION
100	4822 691 10772	CD DRIVE VAM2201
115	4822 466 10736	CARROUSEL
117	4822 532 12365	BUSH DRAWER
123	4822 402 11237	SWITCH BRACKET
125	4822 401 11708	DISC CLAMP

ELECTRICAL PARTSLIST 3CDC-99 MODULE

MISCELLANEOUS

1800	4822 265 10925	FLEX FOIL CONNECTOR 15PIN
1805	4822 265 11533	FLEX FOIL CONNECTOR 23PIN
1805	2422 025 09768	FLEX FOIL CONNECTOR 19PIN
1805	4822 267 51322	FLEX FOIL CONNECTOR 15PIN
1880	4822 276 13503	SWITCH
1881	4822 276 13503	SWITCH
1882	4822 276 13503	SWITCH
8001	4822 320 12659	FLEX FOIL 23PIN 480MM *
8001	4822 320 12729	FLEX FOIL 23PIN 400MM
8001	4822 320 12658	FLEX FOIL 19PIN 480MM
8001	4822 320 12232	FLEX FOIL 15PIN 480MM
8005	3103 308 91820	FLEX FOIL 15PIN 95MM

* will be replaced by shorter length (400mm) when stock is out.

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 124 40246	4,7μF	20%	63V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12787	330pF	10%	50V
2808	4822 122 10466	220pF	10%	50V
2809	5322 124 41948	0,47μF	20%	50V
2810	4822 126 10053	180pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2814	4822 126 12785	47nF	20%	50V
2815	4822 126 12882	100nF	20%	50V
2816	4822 126 12878	1,5nF	10%	16V
2818	4822 126 12878	1,5nF	10%	16V
2822	4822 126 12339	2,2nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 11585	22nF	20%	50V
2825	4822 126 12785	47nF	20%	50V
2826	4822 124 80231	47μF	20%	16V
2828	4822 124 40433	47μF	20%	25V
2829	4822 124 21732	10μF	20%	25V
2830	4822 126 12785	47nF	20%	50V
2831	4822 122 33195	100pF	10%	50V
2832	4822 122 33195	100pF	10%	50V
2833	4822 122 33069	33pF	5%	50V
2834	4822 122 33069	33pF	5%	50V
2835	4822 126 12785	47nF	20%	50V
2837	4822 124 40433	47μF	20%	25V
2838	4822 124 41579	10μF	20%	50V
2839	4822 124 40433	47μF	20%	25V
2840	4822 126 12882	100nF	20%	50V
2841	4822 126 12702	270pF	10%	50V
2842	4822 126 12339	2,2nF	10%	16V
2844	4822 126 12702	270pF	10%	50V
2849	4822 124 40246	4,7μF	20%	63V
2850	4822 122 33197	1nF	10%	50V
2851	4822 124 40196	220μF	20%	16V
2852	4822 126 12785	47nF	20%	50V
2853	4822 126 11585	22nF	20%	50V
2854	4822 126 12785	47nF	20%	50V
2855	4822 122 33519	470pF	10%	50V
2856	4822 122 33848	47pF	5%	50V
2857	4822 121 51387	10nF	20%	16V
2858	4822 124 40196	220μF	20%	16V
2859	4822 121 51387	10nF	20%	16V
2860	4822 124 41579	10μF	20%	50V
2861	4822 124 41579	10μF	20%	50V

CAPACITORS

2862	4822 122 10466	220pF	10%	50V
2863	4822 122 10466	220pF	10%	50V
2864	4822 122 33191	22pF	5%	50V
2865	4822 126 11585	22nF	20%	50V
2867	4822 122 10466	220pF	10%	50V
2869	4822 126 12785	47nF	20%	50V
2872	4822 126 12785	47nF	20%	50V
2873	4822 124 12233	47μF	20%	25V
2875	4822 126 11585	22nF	20%	50V
2876	4822 124 40196	220μF	20%	16V
2877	4822 122 10319	82pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 126 12785	47nF	20%	50V
2882	4822 122 10466	220pF	10%	50V
2884	4822 124 40246	4,7μF	20%	63V
2885	4822 124 40246	4,7μF	20%	63V
2887	4822 126 12882	100nF	20%	50V
2888	4822 124 40246	4,7μF	20%	63V
2891	4822 122 10576	1,8nF	10%	16V
2892	4822 126 11714	4,7nF	20%	16V
2893	4822 122 10466	220pF	10%	50V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 83872	220Ω	5%	0,5W
3706	4822 116 83883	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3709	4822 116 83864	10kΩ	5%	0,5W
3711	4822 116 83864	10kΩ	5%	0,5W
3712	4822 116 52176	10Ω	5%	0,5W
3713	4822 116 52257	22kΩ	5%	0,5W
3714	4822 116 83864	10kΩ	5%	0,5W
3715	4822 116 52234	100kΩ	5%	0,5W
3716	4822 116 83883	470Ω	5%	0,16W
3718	4822 116 52283	4,7kΩ	5%	0,5W
3727	4822 116 52283	4,7kΩ	5%	0,5W
3728	4822 116 52283	4,7kΩ	5%	0,5W
3730	4822 116 52271	33kΩ	5%	0,16W
3731	4822 116 83864	10kΩ	5%	0,5W
3740	4822 116 52257	22kΩ	5%	0,5W
3741	4822 116 52257	22kΩ	5%	0,5W
3742	4822 116 52257	22kΩ	5%	0,5W
3743	4822 116 52257	22kΩ	5%	0,5W
3744	4822 116 83864	10kΩ	5%	0,5W
3746	4822 116 83864	10kΩ	5%	0,5W
3750	4822 050 11002	1kΩ	5%	0,2W
3751	4822 050 11002	1kΩ	5%	0,2W
3800	4822 116 52291	56kΩ	5%	0,5W
3801	4822 116 83864	10kΩ	5%	0,5W
3802	4822 116 52291	56kΩ	5%	0,5W
3803	4822 116 83864	10kΩ	5%	0,5W
3805	4822 116 83864	10kΩ	5%	0,5W
3806	4822 116 83864	10kΩ	5%	0,5W
3807	4822 116 83864	10kΩ	5%	0,5W
3808	4822 116 83864	10kΩ	5%	0,5W
3809	4822 116 83876	270Ω	5%	0.16W
3811	4822 116 52251	18kΩ	5%	0,5W
3812	4822 053 10228	2,2Ω	5%	1W
3814	4822 116 52191	33Ω	5%	0,5W
3815	4822 052 10478	4,7Ω	5%	NFR
3819	4822 116 83883	470Ω	5%	0,16W
3820	4822 116 52283	4,7kΩ	5%	0,5W
3821	4822 116 52283	4,7kΩ	5%	0,5W

ELECTRICAL PARTSLIST 3CDC-99 MODULE

RESISTORS

3822	4822 116 52249	1,8kΩ	5%	0,16W
3823	4822 050 11002	1kΩ	5%	0.2W
3824	4822 050 11002	1kΩ	5%	0.2W
3825	4822 050 11002	1kΩ	5%	0.2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 116 52271	33kΩ	5%	0,16W
3828	4822 116 52257	22kΩ	5%	0.5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 116 83864	10kΩ	5%	0,5W
3833	4822 116 52257	22kΩ	5%	0.5W
3834	4822 116 52257	22kΩ	5%	0.5W
3835	4822 052 10338	3,3Ω		NFR25
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52234	100kΩ	5%	0,5W
3840	4822 116 52234	100kΩ	5%	0.5W
3841	4822 116 52283	4,7kΩ	5%	0.5W
3842	4822 116 83884	47kΩ	5%	0.16W
3843	4822 116 52271	33kΩ	5%	0,16W
3844	4822 116 52283	4,7kΩ	5%	0.5W
3845	4822 116 83884	47kΩ	5%	0,16W
3846	4822 116 52271	33kΩ	5%	0.16W
3847	4822 116 83961	6,8kΩ	5%	0.16W
3848	4822 116 52234	100kΩ	5%	0,5W
3849	4822 116 52234	100kΩ	5%	0.5W
3850	4822 116 52276	3,9kΩ	5%	0,5W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10228	2,2Ω	5%	0,33W
3853	4822 116 83883	470Ω	5%	0.16W
3854	4822 116 52175	100Ω	5%	0,5W
3855	4822 116 52175	100Ω	5%	0,5W
3857	4822 116 52191	33Ω	5%	0.5W
3858	4822 116 52257	22kΩ	5%	0.5W
3859	4822 116 52257	22kΩ	5%	0,5W
3860	4822 116 83864	10kΩ	5%	0.5W
3861	4822 116 83864	10kΩ	5%	0.5W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52191	33Ω	5%	0,5W
3864	4822 116 52175	100Ω	5%	0,5W
3866	4822 116 83864	10kΩ	5%	0,5W
3867	4822 116 83868	150Ω	5%	0.5W
3869	4822 050 24708	4,7Ω	1%	0.6W
3870	4822 116 52175	100Ω	5%	0.5W
3871	4822 116 83864	10kΩ	5%	0.5W
3872	4822 116 83864	10kΩ	5%	0,5W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 116 83864	10kΩ	5%	0.5W
3875	4822 116 83864	10kΩ	5%	0.5W
3876	4822 116 83864	10kΩ	5%	0.5W
3877	4822 116 83864	10kΩ	5%	0.5W
3878	4822 116 83864	10kΩ	5%	0.5W
3879	4822 116 83864	10kΩ	5%	0,5W
3880	4822 116 52219	330Ω	5%	0.5W
3881	4822 116 83864	10kΩ	5%	0.5W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0.5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0.5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 116 83883	470Ω	5%	0,16W
3888	4822 116 83864	10kΩ	5%	0.5W
3889	4822 116 83883	470Ω	5%	0,16W
3890	4822 050 11002	1kΩ	5%	0,2W
3891	4822 050 11002	1kΩ	5%	0,2W

RESISTORS

3892	4822 116 83883	470Ω	5%	0,16W
3893	4822 116 83883	470Ω	5%	0,16W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3897	4822 116 52175	100Ω	5%	0,5W
3899	4822 116 52175	100Ω	5%	0,5W

COILS

1810	4822 242 10849	QUARTZ 8,46MHz
1810	4822 242 73557	CERAMIC RES. 8,46MHz
5802	4822 156 31058	FILTER DIGITAL OUT

DIODES

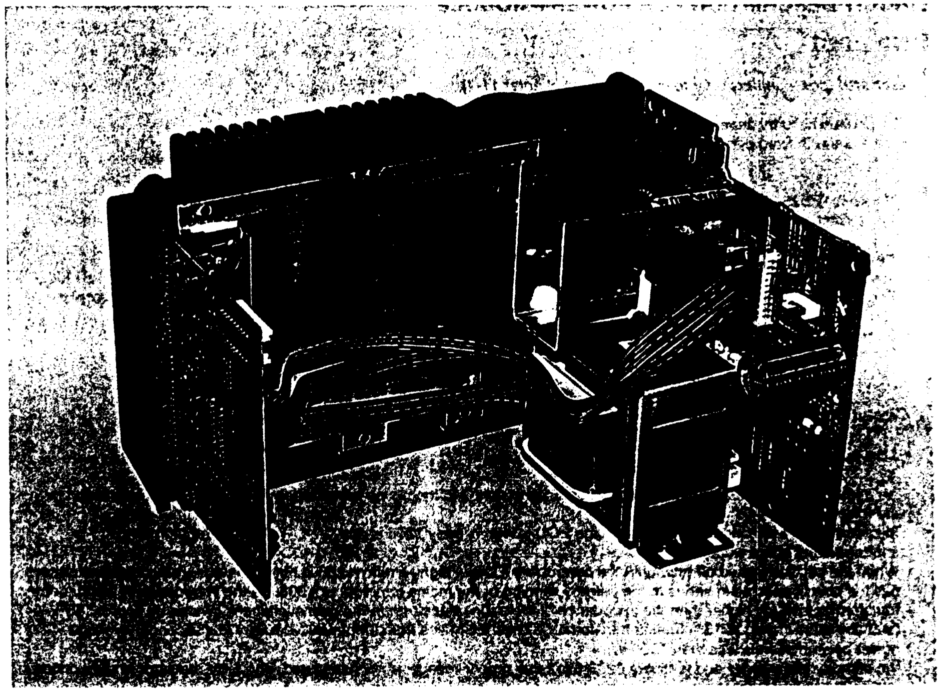
6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	4822 130 34233	BZX79-B5V1
6877	4822 130 31981	BZX79-C3V9

TRANSISTORS

7812	4822 130 40959	BC547B
7874	4822 130 40959	BC547B
7875	4822 130 40959	BC547B

INTEGRATED CIRCUITS

7801 ©	4822 209 17286	TZA1024T/N1 HF-AMPLIFIER
7805	4822 209 17284	TDA1308 OPAMP
7806	4822 209 32852	TDA7073A/N2 SERVO DRIVER
7807	4822 209 32852	TDA7073A/N2 MOTOR DRIVER
7871	4822 209 32852	TDA7073A/N2 MOTOR DRIVER
7873	5322 209 10421	HEF4094BP SHIFT REGISTER
7876 ©	4822 209 16143	LC89170M CD TEXT
7877 ©	4822 209 17285	SAA7324H/M1 SIGNAL PROCESSOR



POWER 4-99 Module

(2 Channel Version)

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Circuit diagram Supply part 11-7
Component layout 11-8
Circuit diagram Power stage 11-9
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CIRCUIT DESCRIPTION FOR POWER4-MODULE

Supply-part

***General** (pos. numbers refer to circuit diagram chapter 11-7)*

The primary circuitry depends on the version:

- Versions with fixed primary voltage: 100VAC for /26
  120VAC for /37
  220-240VAC for /22/25/30/33/34
  Versions /22/25/26/37 use radial type-fuse 1201, versions /30/33/34 use glass tube fuse 1202.
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- Version with switchable primary voltage: 110-127/220-240VAC for /21
  In version /21 voltage selector 1210 is built-in and each primary winding is protected separately (fuses 1201 and 1200).
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- European versions – "*low power standby feature*"
  For detailed description see below.

Circuit details:

- **Low power standby feature**

An additional small standby transformer, connected in series to the mains transformer, reduces power consumption in standby-mode.
In case power is switched on, the control line ECO is low → relay 1208 is activated → standby transformer 5211 is shortened and out of work.
When the set is switched off (standby) the control line ECO is high → relay 1208 is not activated → standby transformer 5211 is now connected in series to the primary winding of the mains transformer 1008. As the impedance of the standby transformer is much higher than the impedance of the mains transformer, the mainsvoltage is divided by approx. 85% (standby transformer) to 15% (mains transformer). Thus the mains transformer delivers very low secondary voltage → power consumption is less than 100mW.
Via standby transformer and rectifiers 6209-6212 the supply voltage +C is substituted. The 5,6V regulator is still working and so the microprocessor is kept running.

- **DC voltages +A, +B1/+B2, +C**

These voltages supply the Super Class G amplifier, described later in this chapter.
The whole power supply is optimized for the special characteristic of this type of amplifier. For that reason several "tricky" details have been applied to ensure optimal efficiency and symmetrical load to the mains transformer.

Generation of +A

Common full wave rectifying with bridge rectifier 6201, using 100% secondary winding of mains transformer (pin 11-15).

Generation of +B1/+B2

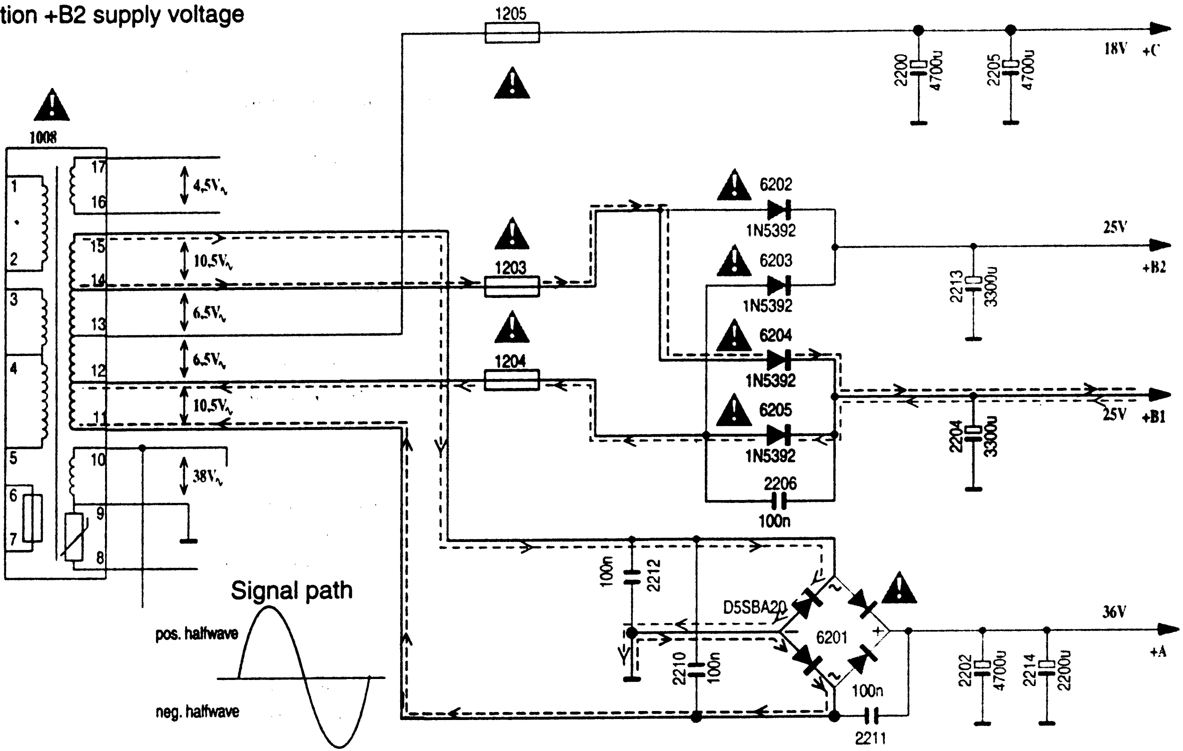
The power supply is designed to cover both, 2-channel and 4-channel application.
While for 2-channel application only one supply voltage +B1 is sufficient, 4-channel application requires an additional supply part +B2 which supplies the Center/Surround-amplifiers and the +12V-regulator (current required by 4 amplifiers would overload a single rectifier).

The supply for 2-channel versions consists of one full wave rectifier:
- 2 diodes of bridge rectifier 6201, with 6204/6205 for generation of +B1
- +B2 is connected in parallel with a bridge wire.

The supply for 4-channel versions consists of two separate full wave rectifiers:
- 2 diodes of bridge rectifier 6201, with 6204/6205 (for +B1) and
- 2 diodes of bridge rectifier 6201, with 6202/6203 (for +B2),

using approx. 70% secondary winding of mains transformer (pin 11-14 respectively pin 12-15).
As example for generation of +B2 see picture 1.

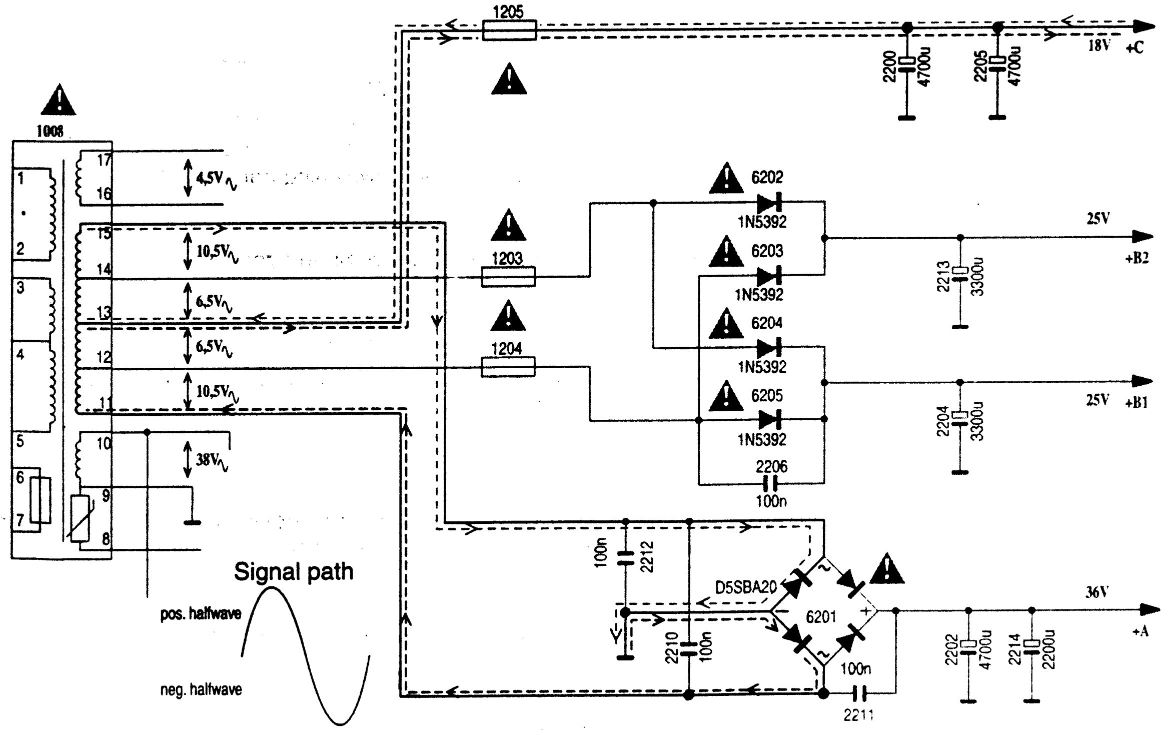
Generation +B2 supply voltage


1205
18V +C
2200 4700u
2205 4700u
1008
17
16
4,5V
15
14
10,5V
13
6,5V
12
6,5V
11
10,5V
10
38V
9
8
1
2
3
4
5
6
7
6202 1N5392
6203 1N5392
6204 1N5392
6205 1N5392
1203
1204
25V +B2
2213 3300u
25V +B1
2204 3300u
2206 100n
100n 2212
D5SBA20
6201
2210 100n
100n 2211
36V +A
2202 4700u
2214 2200u
Signal path
pos. halfwave
neg. halfwave

picture 1

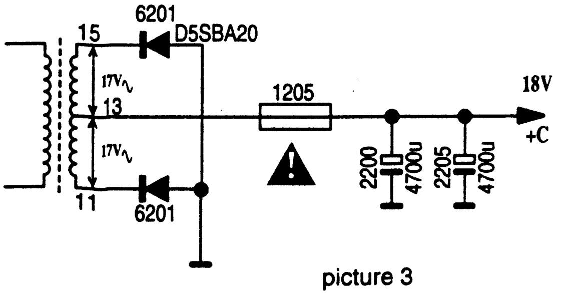
Generation of +C

Full wave rectifying with 2 diodes of bridge rectifier 6201, using 50% secondary winding of mains transformer (pin 13-15/13-11). See pictures 2 and 3 below.


1205
18V +C
2200 4700u
2205 4700u
1008
17
16
4,5V
15
14
10,5V
13
6,5V
12
6,5V
11
10,5V
10
38V
9
8
1
2
3
4
5
6
7
6202 1N5392
6203 1N5392
6204 1N5392
6205 1N5392
1203
1204
25V +B2
2213 3300u
25V +B1
2204 3300u
2206 100n
100n 2212
D5SBA20
6201
2210 100n
100n 2211
36V +A
2202 4700u
2214 2200u
Signal path
pos. halfwave
neg. halfwave

picture 2

Simplified


6201
D5SBA20
15
17V
13
17V
11
6201
1205
18V
+C
2200 4700u
2205 4700u

picture 3

Circuit details (continoued):

- **Supply voltages for FTD** (Fluorescent Tube Display)
  The FTD requires two supply voltages, delivered by separate windings of the mains transformer:
  - 4,5VAC for FTD heating (transformer pin 16/17)
  - -30V stabilized by the -30V regulator located on the amplifier part. The supply part delivers -35V unstabilized (transformer pin 9/10), typical value: -35V...-45V.

- **Stabilized +5V6**
  Stabilizer 7201 generates the supply voltage +5V6 for the microprocessor. In fault condition the output voltage can rise up to approx. 17V, which would definitely damage the device. Therefore an overvoltage protection for the +5V6 supply is implemented.
  Whenever the output of stabilizer rises above 7,5V, the base of 7202 reaches 0,7V (7,5V - voltage drop on 6207), the transistor switches through and short circuits the input voltage. This causes the safety resistor 3204 to blow out and interrupt immediately.

- **Temperature monitoring**
  The mains transformer is equipped with a NTC, embedded in the secondary winding (pin 8/9). Via the NTC line the temperature of the mains transformer is continuously monitored by the microprocessor. Further actions depend on the software of the set. Usually the set will be switched to standby mode when the transformer is overheated.

- **Power down (PWDN) monitoring**
  In order to enable proper switch off conditions the mains supply is monitored by the microprocessor via the PWDN line.
  In case of mains supply interrupts the PWDN line becomes low, while the +5V6 is still stable. This enables the microprocessor to take actions for a save shut-down (e.g. mute, reset of electronics, release of head support of tape deck).

Amplifier part

+12V-regulator *(pos. numbers refer to circuit diagram chapter 11-9)*

Is used to supply all motors (+12M) and all analogue circuits (+12A) in the set. +12C is provisional only.

- **Power on/off:**
  Switching on/off is done via the STBY-line from the microprocessor. H=ON, L=OFF
  If the STBY line is high - transistor 7222 is conductive. Base of 7224 becomes less positive than the emitter. This causes transistor 7224 to switch trough and supply the base of 7221. Consequently 7221 swiches trough too.
  Via 3218 transistor 3228 is conductive as soon as B2 is available. Consequently switching transistor 7227 is also switched through.

  If the STBY line is switched to low level base current for 7222 is blocked. In turn 7224 and 7221 are blocked. → OFF.

- **Regulation:**
  Key components are power-transistor 7221, reference diode 6221 and transistor 7223.
  After power is switched on via the STBY line as described above the +12A increases until 7223 becomes conductive via reference diode 6221 → 7223 reduces base current of 7221 → +12A is stable (typical +12,4V).
  In normal operating mode 7227 is always switched trough as described above.

- **Protections:**
  In case of overcurrent (typical 2,5A) 7227 gets out of saturation → 7226 becomes conductive → 7225 becomes conductive via 6225 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.
  Restarting is only possible with power OFF→ ON.

  In case of overvoltage (more than +15V on emitter of 7221) 7225 is now activated via 6233 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.

  These protections are implemented for saving the set-electronic in any fault-condition.

-30V-regulator

- Grid supply for the FTD switched by the microprocessor.
  Simple regulation with 6251 as reference. Typical value: -29V. Maximum current: 30mA

Circuit details (continoued):

VCD- Supply:

Is a provision for versions with a Video CD Player.

This circuitry consists of a switched supply with a regulator to 5,1V (±0,15V).

- **Switching on/off** is done via the VCD_ON line from the microprocessor (H=on, L=off). If the VCD_ON line is high - transistor 7236 becomes conductive. This causes transistor 7238 to switch through. +5VCD is available. If the VCD_ON is low - transistor 7236 is blocked → no base current through 7238 → transistor 7238 is blocked too → +5VCD is switched off.

- **Regulation** is done via Z- diode 6244 and transistor 7237.
  If the +5VCD exceeds 5,1V the basis of transistor 7237 becomes higher than 0,6V via Z- diode 6244. Consequently transistor 7237 becomes conductive. This causes a reduced base current through 7236. Transistor 7236 becomes less conductive and reduces the base current trough 7238. Transistor 7238 becomes less conductive too and reduces the +5VCD.

Amplifier:

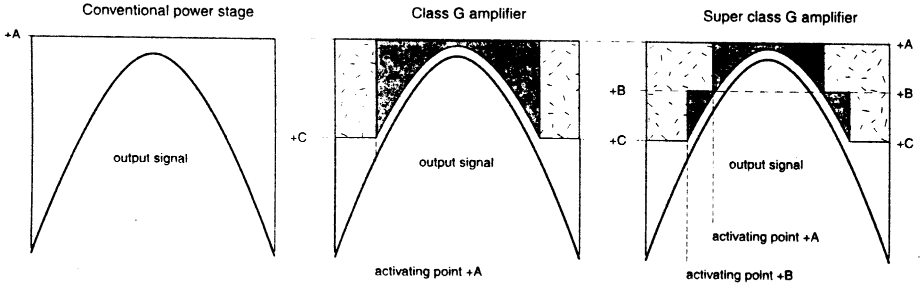
Attention: In the POWER 4 module the power amplifier IC AN7164 is used as a bridge-amplifier.
Any connection from output to ground will destroy the outpout stages!

- Via the AMP_ON control line, connected to pins 6 (Stby), the power amplifiers are switched on/off by the µP.
  High level (approx. 4,5V): power amplifiers switched on
  Low level (approx. 0V): power amplifiers switched off

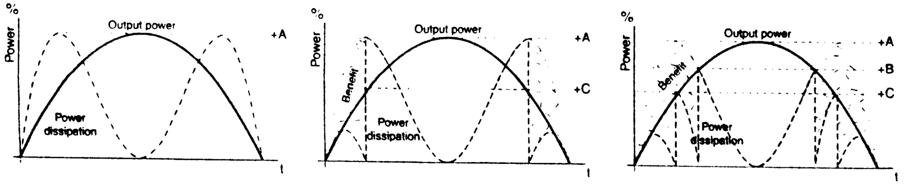
- Super class G - operation

  The power amplifiers operate as so-called super class G - amplifiers:
  The supply pins 12 (Vcc) are not just connected to one fixed DC-supply as in conventional amplifiers.
  Dependent on the output power there are three different DC-voltages supplied to the power amplifiers:
  ⇒ +C (+18V) for low output power
  ⇒ +B (+25V) for medium output power
  ⇒ +A (+36V for high output power

Principle / benefit of Super Class G



☐ Voltage drop on power stage IC
▨ Voltage drop on switching transistor(s)
▧ Benefit - voltage drop on switching transistor(s) reduces total power dissipation



- advantages: - best efficiency
  - less power drawn from the mains transformer than by conventional operating amplifiers reduces transformer heating.
  - reduced power dissipation at the amplifier ICs results in
    - less junction temperature and better reliability
    - possibility of higher output power with smaller cooling fin
    - smaller size

- Functional description of the super class G - circiuitry used in Power4-module

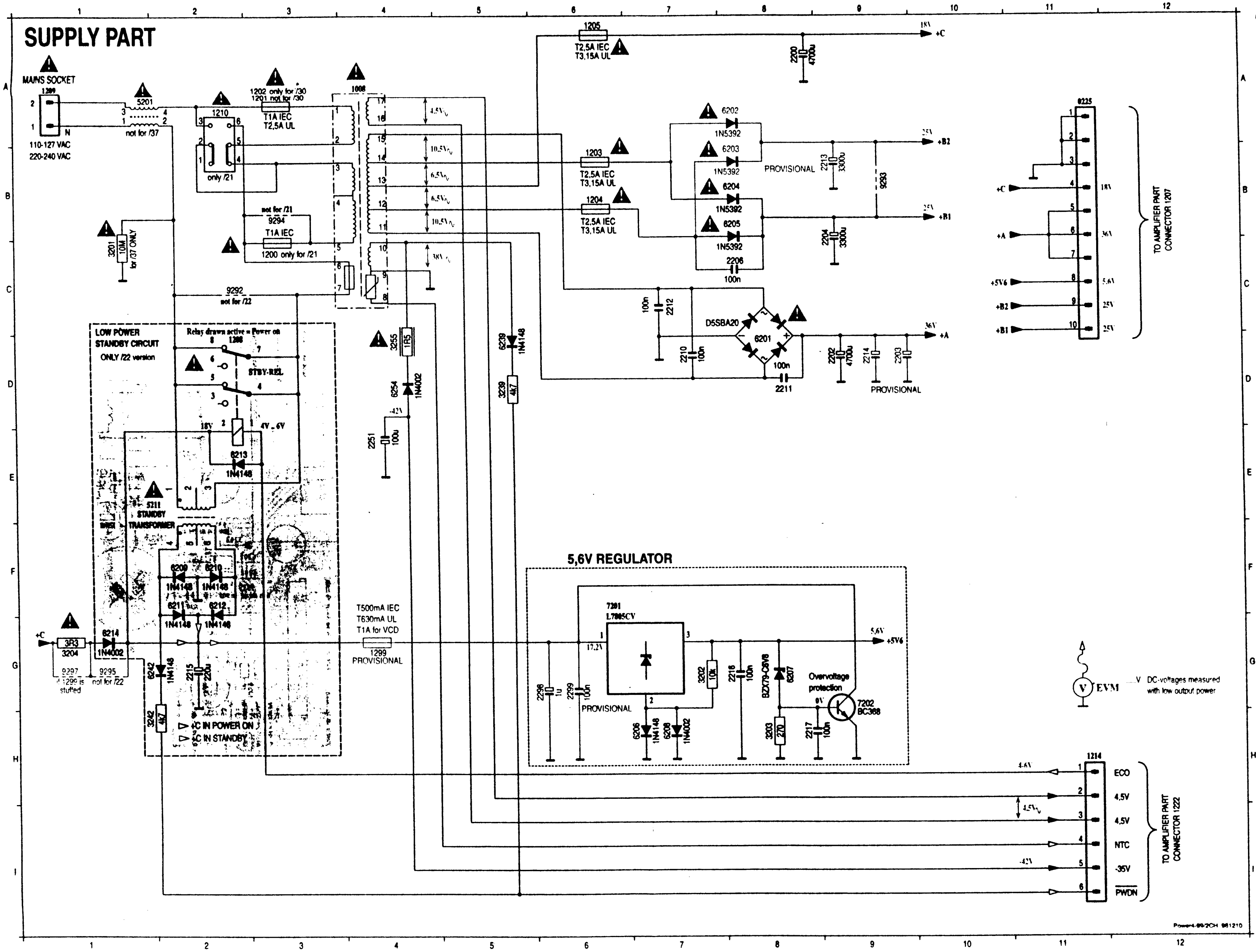
  The DC-level on the amplifier output pins is normally Vcc/2.
  With low signals +C is supplying the amplifiers via decoupling diode 6312. The DC-level on the output pins is therefore approx. 8,6V and approx. 8V on the base of 7315.
  When the output signal increases, also DC-level on base of 7315 increases via diodes 6305, 6306, 6307 and 6308. At a certain output power 7315 becomes slightly conductive and enables low base current for 7304 which becomes conductive too and pulls gate of FET 7303 up to a more positive level. Thus FET 7303 begins to switch through and connects the higher DC supply +B1 slowly to the power stages.
  This does not end up in a hard switching but in a smooth regulating because Vcc is coupled back to the emitter of 7315 via Zener diode 6310. As soon as Vcc increases also the level on emitter 7315 is increased by a 3,9V lower level than Vcc.
  When the output power is increased further +B1 would not be high enough to enable undistorted output signal. The more the output level increases the more increases the DC-level on base of 7315 which causes the transistor more and more conducting until the summary of the voltage drop on 3340+E/B 7304+3342 becomes approx. 1,4V. Now the necessary VBE for a darlington-type transistor is obtained, 7305 begins to switch through and connects the again higher DC supply +A slowly to the power stages. 7305 regulates +A, same as described before for +B.
  7322 and 7316 switch the ripple capacitor 2355, dependent on the output power.
  With low output power the DC-level on base 7322 is approx. 8V. Via Zener diode 6310 and resistor 3333 the emitter is pulled to Vcc (+C at low levels). 7322 is switched through and in turn 7316. The ripple capacitor 2325 is connected to ground and functions as in normal amplifiers. Hum is suppressed and good S/N-ratio is guaranteed even during silent music passages.
  When the supply voltage has to be switched to a higher level the DC-level of the ripple capacitor has to increase in the same relation, otherwise the reference voltages inside the IC would not fit to the actual Vcc. Because of the different delays this relation cannot be obtained and a continuously connected capacitor to the ripple input would cause distortion. For that reason the ripple capacitor 2325 is disconnected as soon as the output power exceeds a certain value. When the output signal increases, also DC-level on base of 7322 increases via diodes 6305, 6306, 6307 and 6308. 7322 blocks and in turn 7316. The ripple capacitor 2325 is disconnected from ground. The circuitry is designed so that 2325 is disconnected just before 7303 begins to switch +B through (see above).

- For Center/Surround-amplifier the function of the Super Class G circuit is similar. Instead of +B1 there +B2 is connected.

- For the /37-versions with two channel-application the so called MATRIX SURROUND is added. The 2 surround-speakers are added in a way, that in case of STEREO a high signal can be measured (up to 10W per speaker at 6 Ohm). In MONO only a few 100mW are available. Result: The widening of the STEREO base is increased without any additional electronic or amplifier.

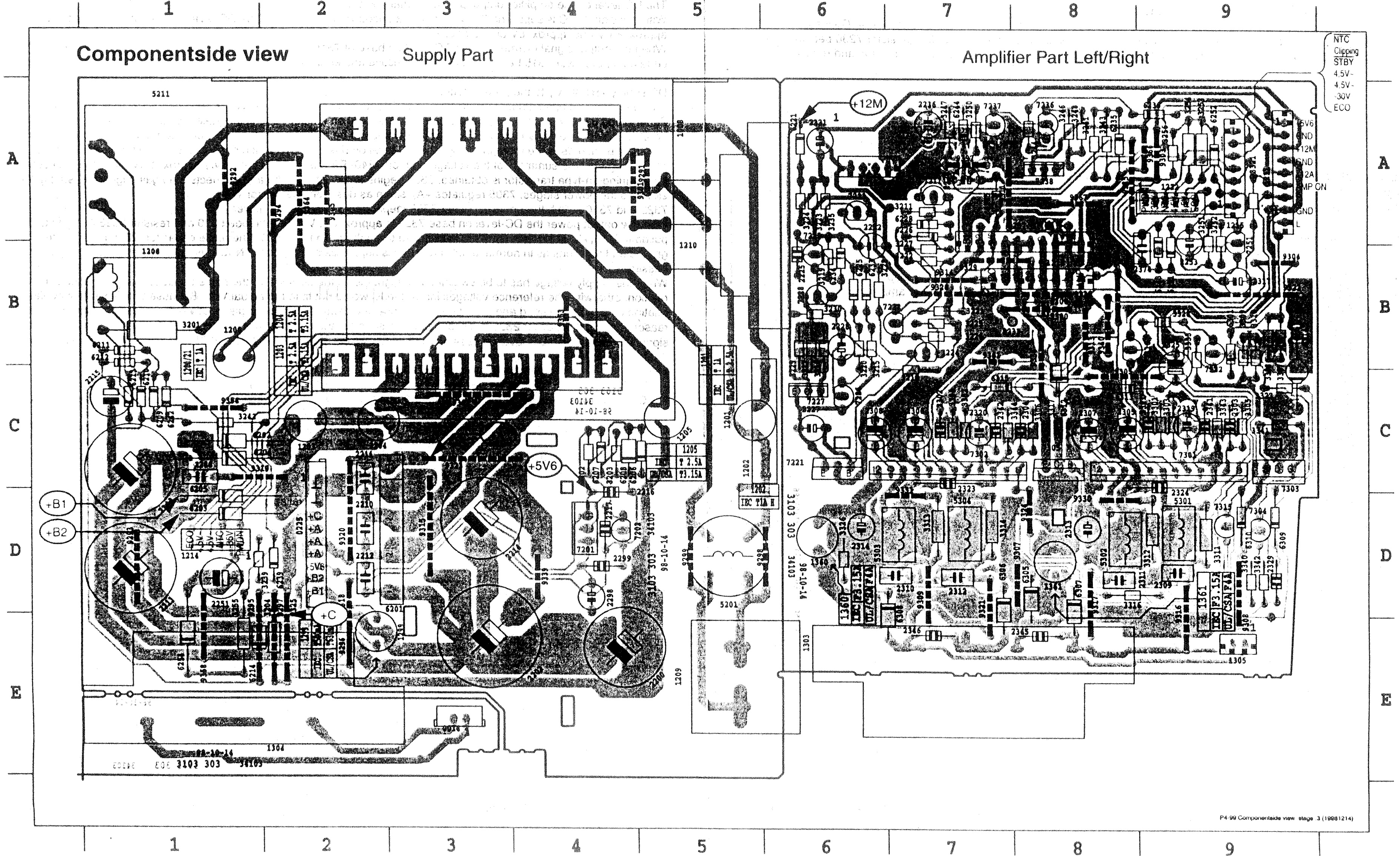
- In all four channel versions a pre-amplifier out for SURROUND is available to add a wireless speaker system
  (e.g. FB206,FB208).

SUPPLY PART


MAINS SOCKET
1209
110-127 VAC
220-240 VAC
N
5201
not for /37
3201
10M
for /37 ONLY
1210
only /21
1202 only for /30
1201 not for /30
T1A IEC
T2,5A UL
not for /21
9294
T1A IEC
1200 only for /21
9292
not for /22
1008
4,5V
10,5V
6,5V
6,5V
10,5V
38V
1205
T2,5A IEC
T3,15A UL
18V
+C
2200
4700u
6202
1N5392
6203
1N5392
6204
1N5392
6205
1N5392
2206
100n
1203
T2,5A IEC
T3,15A UL
1204
T2,5A IEC
T3,15A UL
25V
+B2
25V
+B1
PROVISIONAL
2213
3300u
9293
2204
3300u
2212
100n
2210
100n
D5SBA20
6201
2211
100n
36V
+A
2202
4700u
2214
2203
PROVISIONAL
0225
+C
18V
+A
36V
+5V6
5,6V
+B2
25V
+B1
25V
TO AMPLIFIER PART
CONNECTOR 1207
LOW POWER
STANDBY CIRCUIT
ONLY /22 version
Relay drawn active = Power on
1208
STBY-REL
18V
4V...6V
6213
1N4148
5211
STANDBY
TRANSFORMER
6209
1N4148
6210
1N4148
6211
1N4148
6212
1N4148
3255
1R5
6254
1N4002
-42V
2251
100u
6239
1N4148
3239
4k7
+C
3R3
3204
6214
1N4002
9297
if 1299 is stuffed
9295
not for /22
6242
1N4148
3242
4k7
2215
220u
+C IN POWER ON
+C IN STANDBY
T500mA IEC
T630mA UL
T1A for VCD
1299
PROVISIONAL
5,6V REGULATOR
7201
L7805CV
17,2V
2298
1u
2299
100n
PROVISIONAL
6206
1N4148
6208
1N4002
3202
10k
2216
100n
BZX79-C6V8
6207
Overvoltage
protection
0V
7202
BC368
3203
270
2217
100n
5,6V
+5V6
V EVM
V DC-voltages measured
with low output power
1214
4,6V
ECO
4,5V
4,5V
4,5V
NTC
-42V
-35V
PWDN
TO AMPLIFIER PART
CONNECTOR 1222
Power4-99/2CH 981210

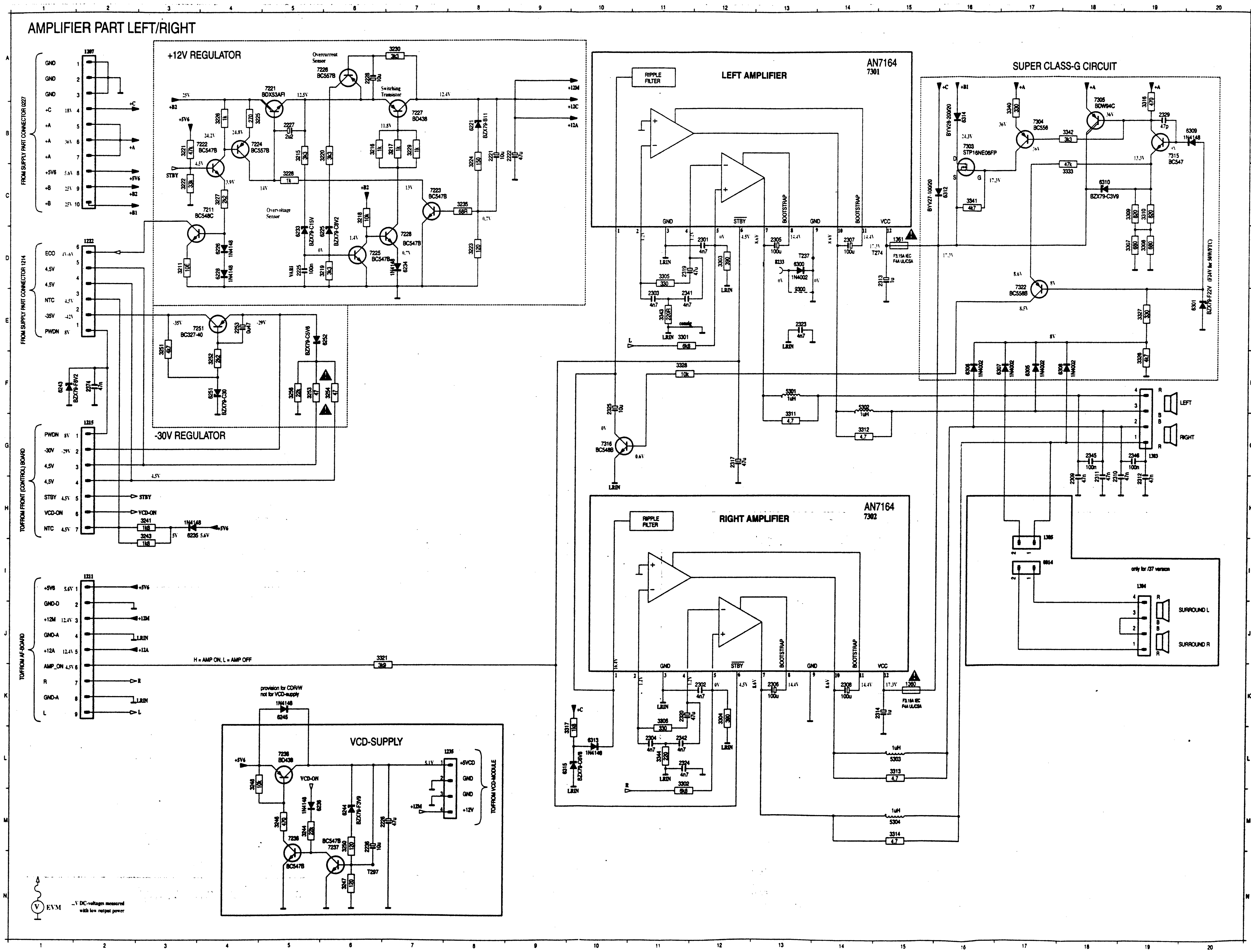
0225	A11
1008	A 4
1200	B 3
1201	A 3
1202	A 3
1203	B 6
1204	B 6
1205	A 6
1208	D 2
1209	B 1
1210	A 2
1214	I11
2200	A 8
2202	D 9
2203	D 9
2204	B 9
2206	C 8
2210	D 7
2211	D 8
2212	C 7
2213	B 9
2214	D 9
2215	G 2
2216	G 7
2217	H 8
2251	E 4
2298	G 5
2299	G 6
3201	C 1
3202	G 7
3203	H 8
3204	G 1
3239	D 5
3242	H 1
3255	D 4
5201	A 1
5211	E 1
6201	C 8
6202	A 8
6203	A 8
6204	B 8
6205	B 8
6206	H 6
6207	G 8
6208	H 7
6209	F 2
6210	F 2
6211	F 2
6212	F 2
6213	E 2
6214	G 1
6239	D 5
6242	G 1
6254	D 4
7201	F 6
7202	G 9
9292	C 2
9293	B 9
9294	B 3
9295	F 4

0016	E	3
0225	D	2
1008	A	3
1200	B	1
1201	C	5
1202	C	5
1203	C	2
1204	C	2
1205	C	5
1207	B	8
1208	B	1
1209	E	5
1210	A	5
1211	A	9
1214	D	1
1215	A	9
1218	B	8
1219	B	8
1222	A	9
1235	A	6
1299	E	2
1303	E	7
1304	E	1
1305	E	9
1360	D	6
1361	D	8
2200	E	5
2202	E	4
2204	C	1
2206	C	1
2210	D	2
2211	C	2
2212	D	2
2213	D	1
2214	D	4
2215	C	1
2216	D	4
2217	D	4
2221	A	6
2222	B	6
2225	B	6
2226	A	7
2227	C	6
2228	B	6
2236	A	7
2251	D	1
2253	A	9
2298	D	4
2299	D	4
2301	C	9
2302	C	7
2303	C	9
2304	C	8
2305	C	8
2306	C	7
2307	C	8
2308	C	6
2309	D	9
2310	D	7
2311	D	8
2312	D	7
2313	D	8
2314	D	6
2317	B	9
2319	C	9
2320	C	7
2323	C	7
2324	C	9
2325	B	9
2329	D	9
2341	C	9
2342	C	7
2345	E	8
2346	E	7
2374	B	9
3201	B	1
3202	C	4
3203	C	4
3204	E	2
3211	A	7
3215	B	6
3216	B	6
3217	B	6
3218	C	7
3219	B	6
3220	B	6
3221	B	7
3222	B	7
3223	A	6
3224	A	6
3225	B	7
3226	B	7
3227	B	7
3228	B	6
3229	B	6
3230	B	6
3235	A	6
3239	D	1
3241	A	8
3242	C	1
3243	A	8
3244	A	8
3246	A	8
3247	A	7
3248	A	8
3250	A	7
3251	A	9
3252	B	9
3253	A	9
3254	A	9
3255	E	1
3256	A	9
3301	C	9
3302	C	7
3303	C	9
3304	C	7
3305	C	9
3306	C	8
3307	B	9
3308	B	9
3309	B	9
3310	B	9
3311	D	9
3312	D	9
3313	D	7
3314	D	7
3316	D	8
3317	C	8
3321	A	9
3326	D	6
3327	C	9
3328	B	9
3333	B	9
3340	D	9
3341	C	9
3342	D	9
3343	C	9
3344	C	7
5201	D	5
5211	A	1
5301	D	9
5302	D	8
5303	D	7
5304	D	7
6201	D	2
6202	C	1
6203	D	1
6204	C	1
6205	D	1
6206	C	5
6207	C	4
6208	C	4
6209	C	1
6210	C	1
6211	B	1
6212	B	1
6213	C	1
6214	E	1
6221	A	6
6225	B	6
6226	A	7
6228	A	7
6233	B	6
6234	B	6
6235	A	8
6236	A	9
6239	D	2
6242	C	1
6243	B	9
6244	A	7
6245	A	7
6251	B	9
6252	A	9
6254	E	1
6300	B	8
6301	B	9
6305	D	8
6306	D	7
6307	D	8
6308	E	6
6309	D	9
6310	D	9
6312	C	8
6313	C	8
6314	C	9
6315	C	7
7201	D	4
7202	D	4
7211	A	7
7221	C	6
7222	B	7
7223	A	6
7224	B	7
7225	B	6
7226	C	6
7227	C	6
7228	B	6
7236	A	8
7237	A	7
7238	A	8
7251	A	9
7301	C	9
7302	C	7
7303	C	9
7304	D	9
7305	C	8
7315	D	9
7316	B	8
7322	B	9
8233	B	7
9281	E	8
9282	E	8
9283	E	8
9284	E	8
9285	E	8
9286	E	9
9287	E	9
9288	E	9
9289	E	9
9290	E	9
9291	A	5
9292	A	1
9293	D	1
9294	A	2
9295	E	1
9296	E	2
9297	E	2
9298	D	6
9299	D	5
9300	B	8
9301	A	4
9302	C	3
9303	A	9
9304	B	9
9305	C	8
9307	D	8
9308	D	9
9309	D	7
9310	C	1
9311	A	7
9313	B	8
9314	B	7
9315	D	3
9316	E	9
9317	D	8
9318	E	2
9320	D	2
9321	D	7
9322	B	9
9323	C	3
9324	D	8
9325	E	2
9328	B	7
9329	B	7
9330	D	8
9331	D	7
9335	A	8
9336	B	8
9338	B	8
9339	D	4
9340	B	8
9350	B	8
9353	B	4
9354	C	1
9361	B	7
9364	A	2
9365	A	2
9366	A	9
9367	A	8
9368	E	1
9397	A	7



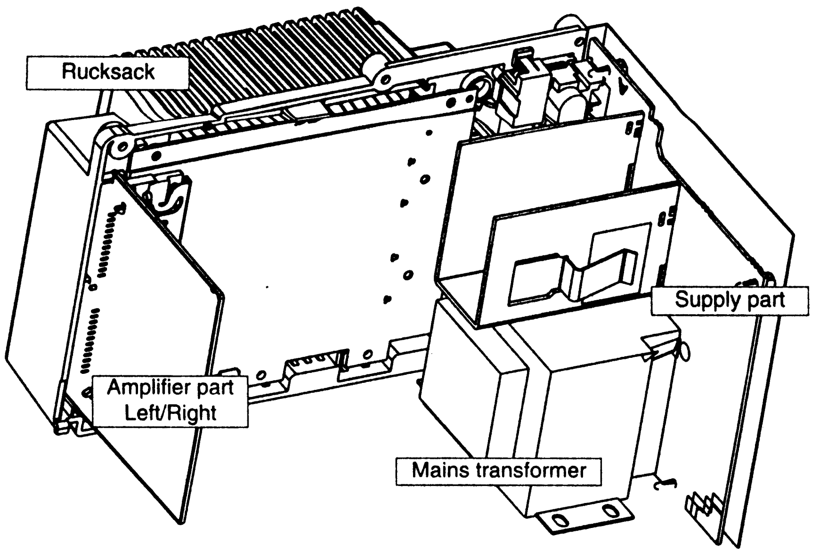
1
2
3
4
5
6
7
8
9
A
B
C
D
E
Componentside view
Supply Part
Amplifier Part Left/Right
NTC
Clipping
STBY
4,5V~
4,5V~
-30V
ECO
5V6
GND
+12M
GND
12A
AMP ON
GND
L
+12M
+5V6
+B1
+B2
+C
5211
1208
1210
1202
1205
1201
3201
1209
1304
5201
1303
1360
1361
6305
7221
7303
3103 303
98-10-14
P4-99 Componentside view stage 3 (19981214)

AMPLIFIER PART LEFT/RIGHT


+12V REGULATOR
-30V REGULATOR
LEFT AMPLIFIER
RIGHT AMPLIFIER
AN7164
7301
7302
RIPPLE FILTER
SUPER CLASS-G CIRCUIT
VCD-SUPPLY
FROM SUPPLY PART CONNECTOR 0227
FROM SUPPLY PART CONNECTOR 1214
TO/FROM FRONT (CONTROL) BOARD
TO/FROM AF-BOARD
TO/FROM VCD-MODULE
1207
1222
1215
1211
1236
GND
+C
+A
+5V6
+B
+B1
ECO
4.5V
NTC
-35V
PWDN
-30V
STBY
VCD-ON
GND-D
+12M
GND-A
+12A
AMP_ON
R
L
+5VCD
+12V
LRIN
H = AMP ON, L = AMP OFF
Overcurrent Sensor
Switching Transistor
Overvoltage Sensor
7221 BDX53AFI
7222 BC547B
7224 BC557B
7226 BC557B
7227 BD438
7223 BC547B
7211 BC548C
7225 BC547B
7228 BC547B
7251 BC327-40
7236 BD438
7238 BC547B
7237 BC547B
7316 BC548B
7303 STP16NE06FP
7304 BC558
7305 BDW94C
7315 BC547
7322 BC558B
6221 BZX79-B11
6233 BZX79-C15V
6225 BZX79-C6V2
6226 1N4148
6228 1N4148
6234 1N4148
6235 1N4148
6243 BZX79-F6V2
6251 BZX79-C30
6252 BZX79-C5V6
6245 1N4148
6236 1N4148
6244 BZX79-F3V9
6300 1N4002
6313 1N4148
6315 BZX79-C6V8
6314 BYV28-200/20
6312 BYV27-100/20
6310 BZX79-C3V9
6309 1N4148
6301 BZX79-F22V (F24V for 5WW/FTC)
6305 1N4002
6306 1N4002
6307 1N4002
6308 1N4002
1360 F3.15A IEC F4A UL/CSA
1361 F3.15A IEC F4A UL/CSA
GND
STBY
BOOTSTRAP
VCC
LEFT
RIGHT
SURROUND L
SURROUND R
1303
1304
1305
9314
only for /37 version
provision for CDR/W not for VCD-supply
5301 1uH
5302 1uH
5303 1uH
5304 1uH
3311 4.7
3312 4.7
3313 4.7
3314 4.7
3321 3k9
3328 10k
3301 6k8
3302 6k8
3241 1k8
3243 1k8
3230 3k3
3235 68R
3228 1k
3342 3k3
3333 47k
3341 4k7
T237
T274
T297
EVM
_V DC-voltages measured with low output power
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
A B C D E F G H I J K L M N

0014	I17
1207	A 2
1211	I 2
1215	G 2
1218	M20
1219	M20
1222	D 2
1235	L 7
1303	G19
1304	I19
1305	I17
1360	K15
1361	D15
2221	B 8
2222	B 9
2225	D 5
2226	M 7
2227	B 5
2228	A 6
2236	M 6
2253	E 4
2301	D12
2302	K12
2303	E11
2304	L11
2305	D13
2306	K13
2307	D14
2308	K14
2309	H18
2310	H18
2311	H18
2312	H19
2313	D15
2314	K15
2317	G12
2319	D11
2320	K11
2323	E13
2324	L11
2325	F10
2329	B19
2341	E11
2342	L11
2345	G18
2346	G19
2374	F 2
3211	D 3
3215	B 5
3216	B 6
3217	B 7
3218	C 6
3219	D 6
3220	B 6
3221	B 3
3222	C 3
3223	D 8
3224	B 8
3225	B 4
3226	B 4
3227	C 4
3228	C 5
3229	B 7
3230	A 7
3235	C 8
3241	H 3
3243	H 3
3244	M 5
3246	M 5
3247	N 6
3248	L 4
3250	M 6
3251	E 3
3252	F 4
3253	F 5
3254	F 6
3256	F 5
3301	E11
3302	L11
3303	D12
3304	K12
3305	D11
3306	K11
3307	D19
3308	D19
3309	C19
3310	C19
3311	G13
3312	G14
3313	L15
3314	M15
3316	B19
3317	L10
3321	J 6
3326	F19
3327	E19
3328	F11
3333	C18
3340	B17
3341	C16
3342	B18
3343	E11
3344	L11
5301	F13
5302	F14
5303	L15
5304	M15
6221	B 8
6225	D 6
6226	D 4
6228	D 4
6233	D 5
6234	D 7
6235	H 3
6236	M 5
6243	F 1
6244	M 6
6245	K 5
6251	F 4
6252	E 5
6300	D13
6301	E20
6305	F17
6306	F16
6307	F17
6308	F18
6309	B20
6310	C18
6312	C16
6313	L10
6314	B16
6315	L 9
7211	C 4
7221	A 5
7222	B 3
7223	C 7
7224	B 4
7225	D 6
7226	A 5
7227	B 7
7228	D 7
7236	M 5
7237	M 6
7238	L 5
7251	E 3
7301	A15
7302	H15
7303	B16
7304	B17
7305	B18
7315	B19
7316	G10
7322	E17
8233	D13
9281	K17
9282	K17
9283	L17
9284	L17
9285	L1
9286	L1
9287	M
9288	M
9289	M
9290	N1
9300	E1

PARTSLIST POWER4 MODULE



MECHANICAL PARTSLIST POWER4 MODULE

4822 426 10607	RUCKSACK for /37 only
4822 426 10608	RUCKSACK not fo /37
4822 492 11735	SPRING TRANSISTOR
4822 492 11068	CLIP RECTIFIER
4822 255 40179	SPRING CLIP TO220

ELECTRICAL PARTSLIST POWER4 MODULE

MISCELLANEOUS

1200	4822 071 51002	FUSE T1A
1201	4822 071 51002	FUSE T1A
1201	4822 253 50137	FUSE T 2,5A UL
1202	4822 252 11224	FUSE T1A
1203	4822 071 52502	FUSE T 2,5A
1203	4822 252 51121	FUSE T3,15A UL
1204	4822 071 52502	FUSE T 2,5A
1204	4822 252 51121	FUSE T3,15A UL
1205	4822 071 52502	FUSE T 2,5A
1205	4822 252 51121	FUSE T3,15A UL
1209	4822 265 31015	MAINS SOCKET, IEC
1209	4822 265 31016	MAINS SOCKET, UL
1210	4822 272 10269	VOLTAGE SELECTOR
1299	4822 071 51002	FUSE T1A
1303	4822 267 31176	SPEAKER TERMINAL
1360	4822 252 11225	FUSE F3.15A IEC 250V
1360	4822 252 11226	FUSE F4A UL/CSA 250V
1361	4822 252 11225	FUSE F3.15A IEC 250V
1361	4822 252 11226	FUSE F4A UL/CSA 250V

CAPACITORS

2200	4822 124 80103	4700µF	20%	25V
2202	4822 124 80415	4700µF	20%	50V
2204	4822 124 42367	3300µF	20%	35V
2206	5322 121 42386	100nF	5%	63V
2210	5322 121 42386	100nF	5%	63V
2211	5322 121 42386	100nF	5%	63V
2212	5322 121 42386	100nF	5%	63V
2216	4822 126 12882	100nF	20%	50V
2217	4822 126 12882	100nF	20%	50V
2221	4822 124 41579	10µF	20%	50V

CAPACITORS

2222	4822 124 40433	47µF	20%	25V
2226	4822 124 40433	47µF	20%	25V
2227	4822 124 41576	2,2µF	20%	50V
2228	4822 124 41579	10µF	20%	50V
2236	4822 124 41579	10µF	20%	50V
2251	4822 124 40255	100µF	20%	50V
2253	4822 124 41407	0,47µF	20%	63V
2301	4822 126 11714	4,7nF	20%	16V
2302	4822 126 11714	4,7nF	20%	16V
2303	4822 126 11714	4,7nF	20%	16V
2304	4822 126 11714	4,7nF	20%	16V
2305	4822 124 81029	100µF	20%	25V
2306	4822 124 81029	100µF	20%	25V
2307	4822 124 81029	100µF	20%	25V
2308	4822 124 81029	100µF	20%	25V
2309	4822 121 43526	47nF	5%	100V
2310	4822 121 43526	47nF	5%	100V
2311	4822 121 43526	47nF	5%	100V
2312	4822 121 43526	47nF	5%	100V
2313	4822 124 40242	1µF	20%	63V
2314	4822 124 40242	1µF	20%	63V
2317	4822 124 40433	47µF	20%	25V
2319	4822 124 40433	47µF	20%	25V
2320	4822 124 40433	47µF	20%	25V
2323	4822 126 11714	4,7nF	20%	16V
2324	4822 126 11714	4,7nF	20%	16V
2325	4822 124 41579	10µF	20%	50V
2329	4822 122 33848	47pF	5%	50V
2341	4822 126 11714	4,7nF	20%	16V
2342	4822 126 11714	4,7nF	20%	16V

ELECTRICAL PARTSLIST POWER4 MODULE

CAPACITORS

2345	4822 126 12882	100nF	20%	50V
2346	4822 126 12882	100nF	20%	50V
2374	4822 121 43526	47nF	5%	100V

RESISTORS

3201	4822 053 21106	10MΩ	5%	0,5W
3202	4822 116 83864	10kΩ	5%	0,5W
3203	4822 116 83876	270Ω	5%	0.16W
3204	4822 052 10338	3,3Ω		NFR25
3215	4822 116 52269	3,3kΩ	5%	0,5W
3216	4822 050 11002	1kΩ	5%	0,2W
3217	4822 050 11002	1kΩ	5%	0,2W
3218	4822 116 83864	10kΩ	5%	0,5W
3219	4822 116 52269	3,3kΩ	5%	0,5W
3220	4822 116 52269	3,3kΩ	5%	0,5W
3221	4822 116 83884	47kΩ	5%	0,16W
3222	4822 116 52271	33kΩ	5%	0,16W
3223	4822 116 52206	120Ω	5%	0,5W
3224	4822 116 83868	150Ω	5%	0,5W
3225	4822 116 83876	270Ω	5%	0.16W
3226	4822 050 11002	1kΩ	5%	0,2W
3227	4822 116 52256	2,2kΩ	5%	0,16W
3228	4822 050 11002	1kΩ	5%	0,2W
3229	4822 050 11002	1kΩ	5%	0.2W
3230	4822 116 52269	3,3kΩ	5%	0,5W
3235	4822 116 52199	68Ω	5%	0,16W
3239	4822 116 52283	4,7kΩ	5%	0,5W
3241	4822 116 52249	1,8kΩ	5%	0,16W
3243	4822 116 52228	680Ω	5%	0,5W
3244	4822 116 52257	22kΩ	5%	0,5W
3246	4822 116 83883	470Ω	5%	0,16W
3247	4822 116 52206	120Ω	5%	0,5W
3248	4822 116 83864	10kΩ	5%	0,5W
3250	4822 116 52206	120Ω	5%	0,5W
3251	4822 116 52283	4,7kΩ	5%	0,5W
3252	4822 116 52256	2,2kΩ	5%	0,16W
3253	4822 052 10479	47Ω	5%	0,3W
3254	4822 052 10479	47Ω	5%	0,3W
3255	4822 117 12148	1,5Ω	5%	
3256	4822 116 52257	22kΩ	5%	0,5W
3301	4822 116 83961	6,8kΩ	5%	0,16W
3302	4822 116 83961	6,8kΩ	5%	0,16W
3303	4822 116 83881	390Ω	5%	0,5W
3304	4822 116 83881	390Ω	5%	0,5W
3305	4822 116 52219	330Ω	5%	0,5W
3306	4822 116 52219	330Ω	5%	0,5W
3307	4822 116 52228	680Ω	5%	0,5W
3308	4822 116 52228	680Ω	5%	0,5W
3309	4822 116 52231	820Ω	5%	0,5W
3310	4822 116 52231	820Ω	5%	0,5W
3311	4822 050 24708	4,7Ω	1%	0,6W
3312	4822 050 24708	4,7Ω	1%	0,6W
3313	4822 050 24708	4,7Ω	1%	0,6W
3314	4822 050 24708	4,7Ω	1%	0,6W
3316	4822 116 83883	470Ω	5%	0,16W
3317	4822 116 52249	1,8kΩ	5%	0,16W
3321	4822 116 52276	3,9kΩ	5%	0,5W
3326	4822 116 52283	4,7kΩ	5%	0,5W
3327	4822 116 52219	330Ω	5%	0,5W
3328	4822 116 83864	10kΩ	5%	0,5W
3333	4822 116 83884	47kΩ	5%	0,16W
3340	4822 116 52219	330Ω	5%	0,5W
3341	4822 116 52283	4,7kΩ	5%	0,5W
3342	4822 116 52269	3,3kΩ	5%	0,5W
3343	4822 116 83872	220Ω	5%	0,5W
3344	4822 116 83872	220Ω	5%	0,5W

COILS

5201	4822 157 11832	MAINS FILTER
5301	4822 157 62255	COIL 18.5 TURNS
5302	4822 157 62255	COIL 18,5 TURNS
5303	4822 157 62255	COIL 18.5 TURNS
5304	4822 157 62255	COIL 18,5 TURNS

DIODES

6201	4822 130 82078	D5SBA20
6204	5322 130 80686	1N5392
6205	5322 130 80686	1N5392
6206	4822 130 30621	1N4148
6207	4822 130 34278	BZX79-C6V8
6208	4822 130 31878	1N4003G
6221	4822 130 34488	BZX79-C11
6225	4822 130 34382	BZX79-C8V2
6226	4822 130 30621	1N4148
6228	4822 130 30621	1N4148
6233	4822 130 34281	BZX79-C15
6234	4822 130 30621	1N4148
6235	4822 130 30621	1N4148
6239	4822 130 30621	1N4148
6243	4822 130 34382	BZX79-C8V2
6244	4822 130 31981	BZX79-C3V9
6251	4822 130 34328	BZX79-C30
6252	4822 130 34173	BZX79-B5V6
6254	4822 130 31878	1N4003G
6300	4822 130 31878	1N4003G
6301	4822 130 34441	BZX79-F22
6305	4822 130 31878	1N4003G
6306	4822 130 31878	1N4003G
6307	4822 130 31878	1N4003G
6308	4822 130 31878	1N4003G
6309	4822 130 30621	1N4148
6310	4822 130 31981	BZX79-C3V9
6312	4822 130 31982	BYV27-100
6313	4822 130 30621	1N4148
6314	4822 130 80791	BYV28-200/20
6315	4822 130 34278	BZX79-C6V8

TRANSISTORS

7202	5322 130 44647	BC368
7221	4822 130 10812	BDX53BFI
7222	4822 130 40959	BC547B
7223	4822 130 40959	BC547B
7224	4822 130 41691	BC556B
7225	4822 130 40959	BC547B
7226	4822 130 41691	BC556B
7227	4822 130 40995	BD438
7228	4822 130 40959	BC547B
7236	4822 130 40959	BC547B
7237	4822 130 40959	BC547B
7238	4822 130 40995	BD438
7251	4822 130 41327	BC327-40
7303	4822 130 11336	STP16NE06FP
7304	4822 130 41691	BC556B
7305	4822 130 10847	BDW94C
7315	4822 130 40959	BC547B
7316	4822 130 40959	BC547B
7322	4822 130 44568	BC557B

INTEGRATED CIRCUITS

7201	4822 209 80817	L7805CV
7301	4822 209 90411	AN7164
7302	4822 209 90411	AN7164

AF6 BOARD

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BRIEF INTRODUCTION OF THE AF6 BOARD

The AF6 Board consists of the following features :

a. SOFAC IC

SOFAC IC TEA6321 (7511) which includes functions such as source selection, loudness control, dynamic bass control, treble control, front/rear volume control and muting function. Sound features such as DBB, DSC and IS are controllable via I²C Bus from the microprocessor.

The SOFAC IC caters for 4 input sources, namely tuner, tape, CD and AUX.
It also has a MONO input which is tied to ground via a capacitor. In our application, software will switch the input source to previous source MUTE during STANDBY mode and some other occasions where noise from other input source is undesirable.
Note that the input to the SOFAC IC must be ac coupled to prevent 'plop' noise.
Input networks are included to provide appropriate attenuation for various sources.

b. KARAOKE MIC. MIXING

The AF6 Board has provisions which can be configured to cater for one of the following:
NK : Non-Karaoke.
SK : Simple Karaoke which caters for single mic. mixing with additional mic. amplifier board.
FK : Full Karaoke which caters for double mic. mixing with additional mic. amplifier board.

c. DOLBY PRO LOGIC (DPL) INTERFACE

The AF6 Board has provisions which can be configured to cater for Dolby Pro Logic (DPL).

d. LINE OUT

Line out with cinch socket for connection to external amplifier.

e. SUB-WOOFER OUT

Sub-woofer out with cinch socket for connection to active sub-woofer speaker.

f. INCREDIBLE SURROUND

Incredible surround effect using transistor circuit (7531, 7532, 7533, 7534) to create phase shifting and spatial effect.

g. HEADPHONE AMPLIFIER

Headphone Amplifier to drive 32 ohm to 1kohm headphone.

h. CD STANDBY CONTROL

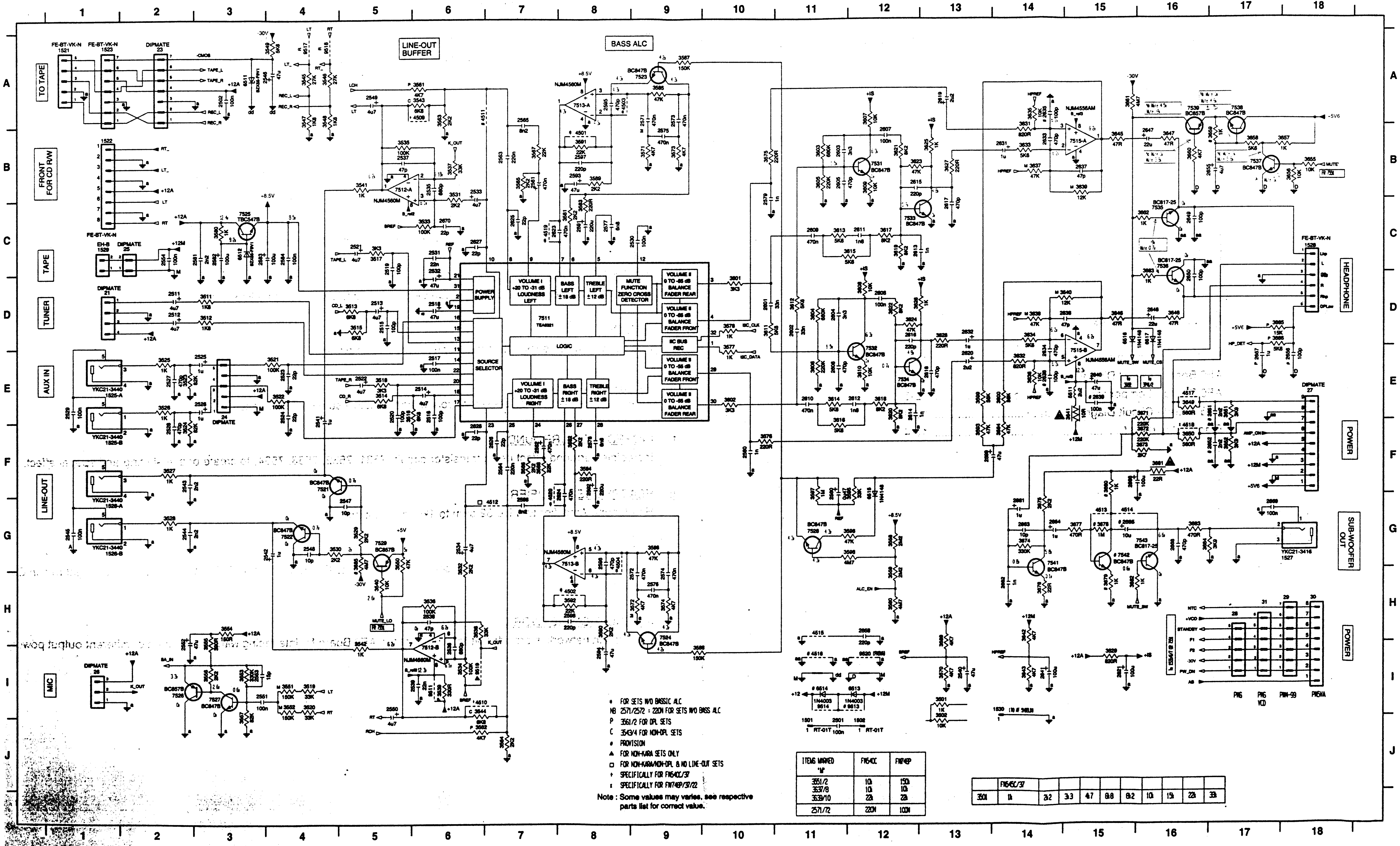
CD Standby Control circuit which switches on the supply to CD servo control IC, HF circuit and the laser light pen in CD mode only.

i. ATTENUATION NETWORK

Attenuation network is provided at the output of the AF6 Board for interfacing with power board of different output power.

AF6 BOARD - CIRCUIT DIAGRAM (PART 1)

21	D1
23	A2
24	E3
25	C2
26	I1
27	E18
28	H17
29	H18
30	H18
31	H17
1501	J11
1502	J12
1521	A1
1522	B1
1523	A1
1525-A	E2
1525-B	F2
1526-A	G2
1526-B	G2
1527	G18
1528	C18
1529	C1
1530	I14
2501	J11
2502	A3
2511	D2
2512	D2
2513	D5
2514	E6
2515	D5
2516	E6
2517	E5
2518	D6
2519	C5
2520	E5
2521	C5
2522	E5
2523	E4
2524	E4
2525	E3
2526	E3
2527	E2
2528	F2
2529	E1
2530	C9
2531	C6
2532	C6
2533	B6
2534	G6
2535	B6
2536	I6
2537	B5
2538	H6
2539	I6
2540	I13
2541	E4
2542	G4
2543	F2
2544	G2
2545	G1
2546	A4
2547	G5
2548	G4
2549	A5
2550	I5
2551	I3
2552	H2
2553	I3
2554	C2
2560	F11
2561	B7
2562	F7
2563	B7
2564	F7
2565	A7
2566	G7
2571	A9
2572	H9
2573	A9
2574	H9
2575	B9
2576	H9
2577	C8
2578	F8
2579	B10
2580	F10
2581	C3
2582	C3
2583	C3
2584	C4
2591	C8
2592	F8
2593	B8
2594	I8
2595	A8
2596	G8
2597	B8
2598	H8
2599	F13
2601	D10
2602	D11
2603	B11
2604	D11
2605	B11
2606	E11
2607	B12
2608	D12
2609	C11
2610	E11
2611	C12
2612	E12
2613	C12
2614	E12
2615	B12
2616	D12
2617	C13
2618	E13
2619	A13
2620	E13
2621	I15
2623	C7
2624	F8
2625	C7
2626	F7
2627	C6
2628	F6
2631	B14
2632	D13
2633	B14
2634	E14
2635	A14
2636	E14
2637	B15
2638	D15
2639	E15
2640	E15
2641	I14
2647	B16
2648	D16
2649	C16
2650	D16
2651	E17
2652	F17
2665	B17
2666	E18
2667	E17
2668	H12
2681	G14
2682	H14
2683	G14
2684	G14
2685	G15
2686	F15
2688	G16
2689	G17
2670	C8
3501	I13
3502	J13
3511	D3
3512	D3
3513	D6
3514	E5
3515	D6
3516	E5
3517	C5
3518	E5
3519	I4
3520	I4
3521	E4
3522	E4
3523	E2
3524	F2
3525	E2
3526	E2
3527	F2
3528	G2
3529	G5
3530	G4
3531	B6
3532	G6
3533	C6
3534	I6
3535	B5
3536	H6
3537	B6
3538	H6
3539	I6
3540	H5
3541	B5
3542	I5
3543	A6
3544	I6
3545	A4
3546	A4
3547	A4
3548	A4
3549	A4
3550	G5
3551	I4
3552	I4
3553	I3
3554	H3
3555	H3
3556	I3
3557	I3
3558	G12
3559	H12
3560	H12
3561	A6
3562	J6
3563	A6
3564	J7
3565	B7
3566	F7
3567	B7
3568	F7
3569	H13
3570	I13
3571	B9
3572	H9
3573	B9
3574	H9
3575	B10
3576	F10
3577	E10
3578	D10
3580	C3
3581	C8
3582	F8
3583	C8
3584	F8
3585	A9
3586	G9
3587	A9
3588	I9
3589	B8
3590	H8
3591	B8
3592	H8
3593	F13
3594	F14
3595	F12
3596	G12
3597	F11
3598	G12
3599	E13
3600	E14
3601	D10
3602	E10
3603	B11
3604	D11
3605	B11
3606	E11
3607	A12
3608	D12
3609	B12
3610	E12
3611	D10
3612	D11
3613	C11
3614	E11
3615	C12
3616	F11
3617	C12
3618	E12
3619	C12
3620	E12
3621	B12
3622	D12
3623	B12
3624	D12
3625	B13
3626	D12
3627	B13
3628	D13
3629	I15
3631	B14
3632	E14
3633	B14
3634	D14
3635	A14
3636	E14
3637	B14
3638	D14
3639	B15
3640	D15
3641	E15
3642	H14
3643	I14
3645	B15
3646	D15
3647	B16
3648	D16
3649	E16
3650	F16
3651	E17
3652	F17
3655	B18
3656	B18
3657	B18
3658	B17
3659	B17
3660	B16
3661	A15
3662	C16
3663	D16
3665	D17
3666	D17
3671	E16
3672	F16
3673	F16
3674	G14
3675	G14
3676	H14
3677	G15
3678	G15
3679	H15
3680	F15
3681	F16
3682	H15
3683	G16
3684	G16
3685	G5
4501	B8
4502	H8
4503	A8
4504	G8
4509	A8
4510	I6
4511	A6
4512	G7
4513	G15
4514	G15
4515	H11
4516	I11
4517	E16
4518	F16
4519	C7
4520	F7
5511	E15
6511	A3
6512	C3
6513	I12
6514	I11
6515	F12
6516	D15
6517	D16
7511	D7
7512-A	B5
7512-B	I6
7513-A	A8
7513-B	G8
7515-A	B15
7515-B	E15
7521	F4
7522	G4
7523	A9
7524	H9
7525	C3
7526	I2
7527	I3
7528	G11
7529	G5
7531	B12
7532	E12
7533	C12
7534	E12
7535	C16
7536	C16
7537	B17
7538	A17
7539	A16
7541	G14
7542	G15
7543	G16
9511	I6
9513	I12
9514	I11
9517	A4
9518	A4
9519	I6
9520	I12


TO TAPE
FRONT FOR CD R/W
TAPE
TUNER
AUX IN
LINE-OUT
MIC
HEADPHONE
POWER
SUB-WOOFER OUT
LINE-OUT BUFFER
BASS ALC
POWER SUPPLY
VOLUME I +20 TO -31 dB LOUDNESS LEFT
VOLUME I +20 TO -31 dB LOUDNESS RIGHT
BASS LEFT ±18 dB
BASS RIGHT ±18 dB
TREBLE LEFT ±12 dB
TREBLE RIGHT ±12 dB
MUTE FUNCTION ZERO CROSS DETECTOR
VOLUME II 0 TO -65 dB BALANCE FADER REAR
VOLUME II 0 TO -65 dB BALANCE FADER FRONT
IIC BUS REC
LOGIC
SOURCE SELECTOR
7511 TEA6321
FE-BT-VK-N
DIPMATE
YKC21-3440
YKC21-3416
NJM4560M
NJM4556AM
BC847B
BC857B
BC817-25
TBC547B
1N4003
1N4148
RT-01T
PW6
PW6 VCD
PWH-99
PW6VA
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F G H I J

♦ FOR SETS W/O BASSIC ALC
NB 2571/2572 : 220N FOR SETS W/O BASS ALC
P 3561/2 FOR DPL SETS
C 3543/4 FOR NON-DPL SETS
● PROVISION
▲ FOR NON-KARA SETS ONLY
□ FOR NON-KARA/NON-DPL & NO LINE-OUT SETS
† SPECIFICALLY FOR FW640C/37
‡ SPECIFICALLY FOR FW748P/37/22

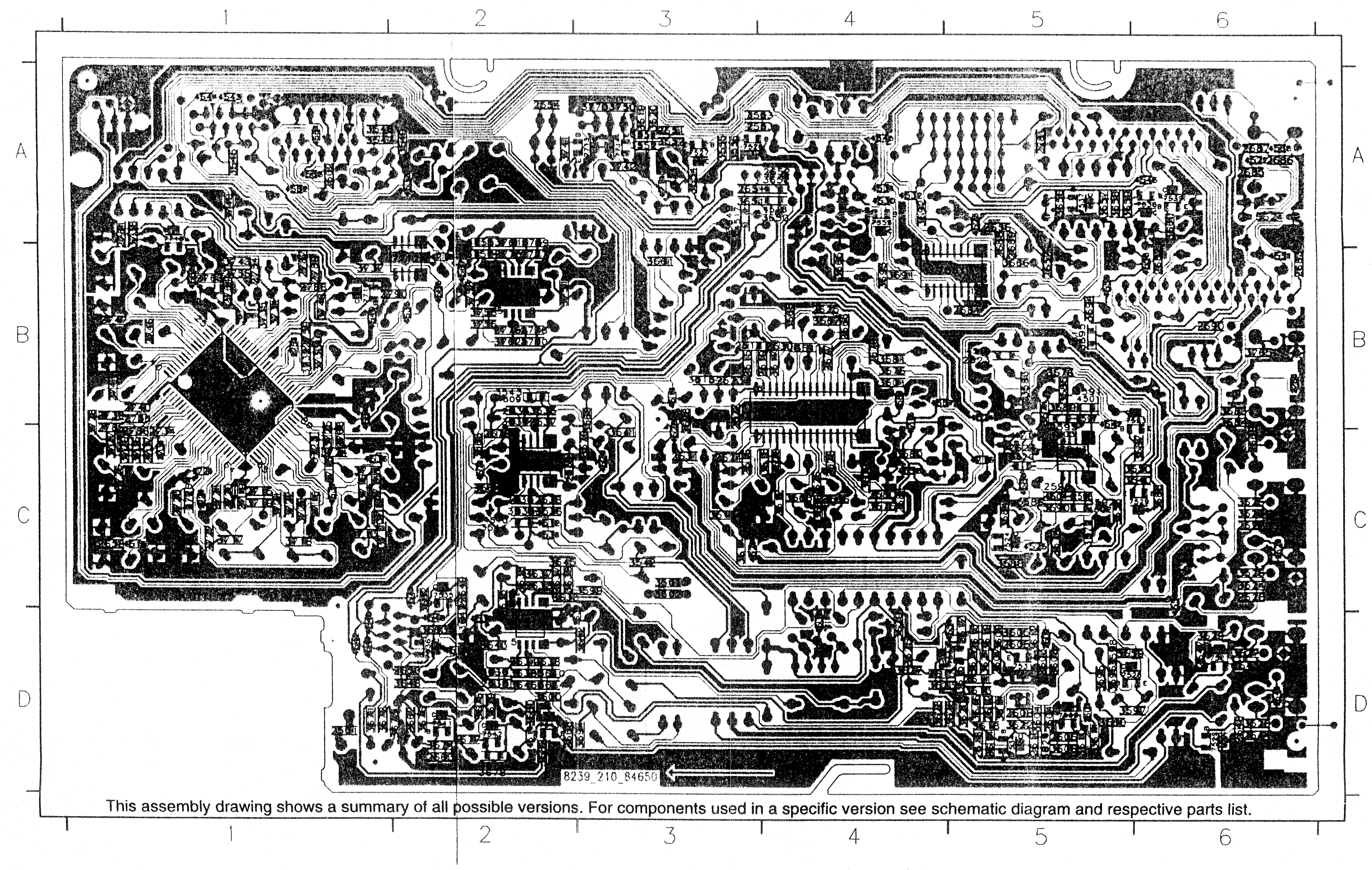
Note : Some values may varies, see respective parts list for correct value.

ITEMS MARKED "M"	FW640C	FW748P
3551/2 3537/8 3539/10	10k 10k 22k	150k 10k 22k
2571/72	220N	100N

	FW645C/37									
3501	1k	2k2	3k3	4k7	6k8	8k2	10k	15k	22k	33k

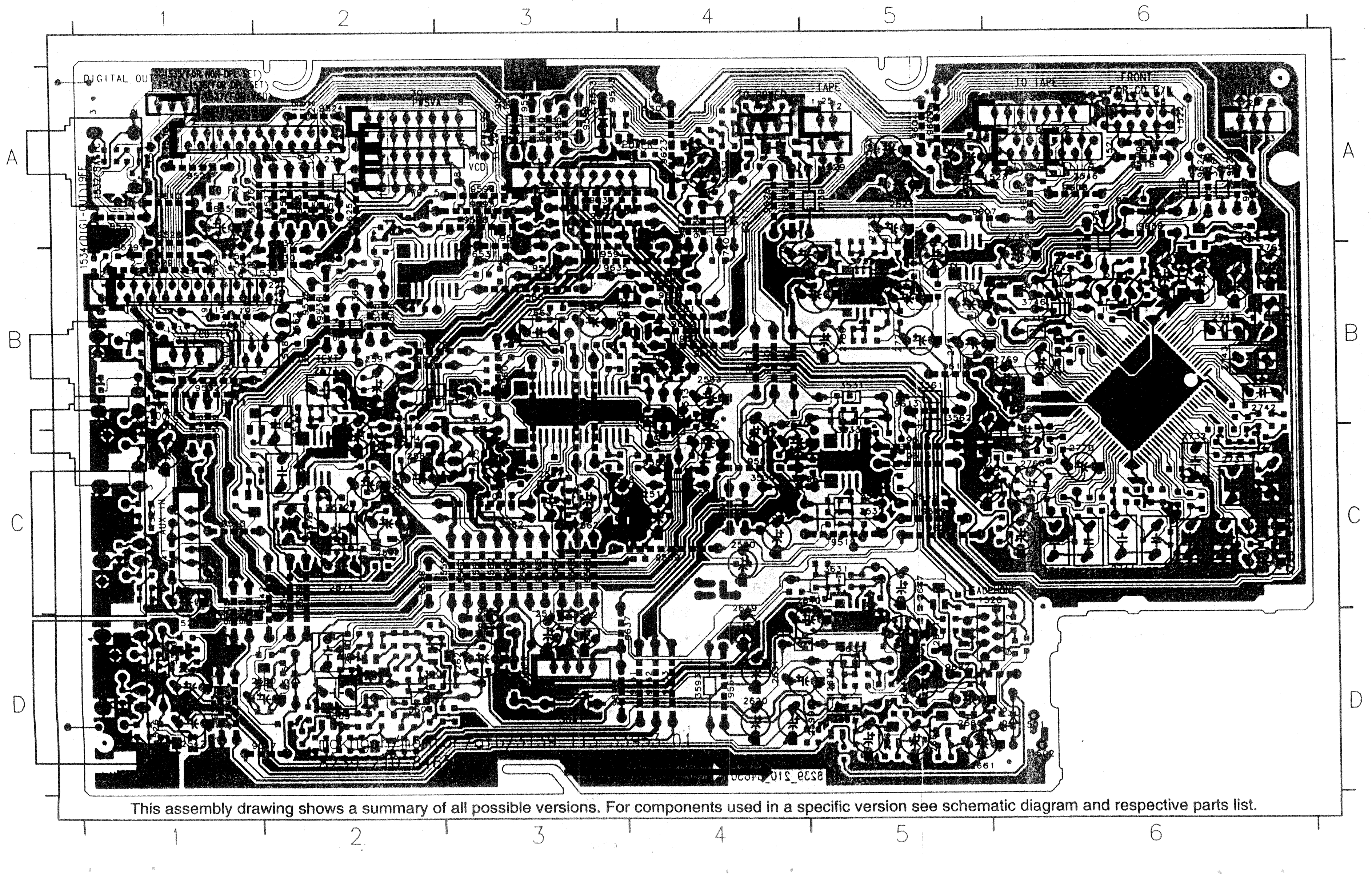
AF6 BOARD - CHIP LAYOUT

2501	D1	2543	D6	2598	C5	2625	B4	2663	D2	2723	C1	2763	B1	3515	B3	3542	C3	3564	C2	3587	C6	3609	D5	3628	D4	3652	A4	3679	D2	3719	C1	3742	A3	4503	C5	4528	C3	4547	B5	4580	C5	7527	A3	7713	A3
2502	A1	2544	D6	2601	D5	2626	C4	2668	D2	2724	C1	2764	B1	3516	C3	3543	B2	3565	B4	3588	C5	3610	D5	3629	D4	3656	A5	3680	D2	3720	C1	3743	B1	4504	C5	4529	C3	4548	D2	4611	B5	7528	D5	7714	A3
2515	B3	2545	D6	2602	D5	2627	B3	2669	C6	2725	C1	2768	C1	3517	B4	3544	C2	3566	C4	3589	B5	3611	D5	3633	C2	3657	A5	3682	D2	3721	C1	3748	B1	4509	B2	4530	A4	4549	B1	4664	B1	7529	C6	7715	A1
2516	C3	2547	D6	2603	D5	2628	B3	2670	C2	2726	C1	2775	B2	3518	C4	3545	A1	3567	B4	3590	C5	3612	D5	3634	D2	3658	A5	3683	B6	3722	C1	3749	A1	4510	C2	4531	A4	4551	B6	4710	B2	7531	D5	7716	B1
2517	B3	2548	D6	2604	D5	2633	C2	2681	B5	2733	C1	2776	B2	3519	A3	3547	A1	3568	C4	3591	B5	3613	D5	3635	C2	3659	A5	3684	B6	3723	C1	3750	A3	4511	B3	4532	A4	4553	C4	4711	A3	7532	D5	7717	B2
2519	B4	2551	A3	2605	D5	2634	D2	2682	B6	2734	C1	2777	B2	3520	A3	3548	A1	3569	B3	3592	C5	3614	D5	3636	D2	3660	A6	3685	C6	3724	C1	3751	B2	4512	C2	4533	A2	4554	D5	4714	C5	7533	D5		
2520	C4	2553	A4	2606	D5	2635	C2	2683	B6	2737	C1	2778	B2	3523	C6	3549	A2	3570	C3	3594	D3	3615	D5	3637	C2	3661	B3	3691	B4	3725	C1	3753	B2	4513	D2	4534	C2	4556	C6	4715	B4	7534	D5		
2523	B3	2554	A2	2607	D5	2636	D2	2685	A6	2738	B1	2781	A5	3524	C6	3550	C6	3571	B5	3595	D5	3616	D5	3638	D2	3662	C2	3692	A4	3726	C1	3755	A2	4514	D2	4535	B2	4557	B4	4716	C5	7535	C2		
2524	C3	2565	B4	2608	D5	2637	C2	2686	A6	2739	B1	2785	C1	3525	C6	3551	A3	3572	C5	3596	D5	3617	D5	3639	C2	3663	D2	3693	B4	3727	C1	3756	B2	4515	C1	4536	C1	4558	B6	5524	A6	7536	D2		
2527	C6	2566	C4	2611	D5	2638	D2	2687	A6	2740	B1	2786	C1	3526	C6	3552	A3	3573	B5	3597	D5	3618	D5	3640	D2	3665	B4	3694	B5	3728	B1	3757	B2	4516	D2	4537	C1	4559	B5	5713	C1	7537	A5		
2528	C6	2577	B4	2612	D5	2639	D2	2688	A5	2741	B1	2787	B1	3527	D6	3553	A4	3574	C5	3598	D5	3619	D5	3642	D3	3666	B5	3695	B5	3729	C1	3758	B2	4517	A3	4538	D4	4561	A1	7511	B4	7538	A6		
2529	C6	2578	C4	2613	D5	2649	C2	2689	A5	2746	B1	2788	B1	3528	D6	3554	A3	3575	B4	3599	C3	3620	D5	3643	D2	3671	D1	3711	C1	3732	B1	3759	A2	4518	A4	4539	D2	4562	A1	7512	C2	7539	A6		
2530	B4	2579	B4	2614	D5	2650	D2	2690	B6	2747	B1	2789	B1	3529	D6	3555	A3	3576	C4	3600	D2	3621	D5	3645	C2	3672	D1	3712	C1	3733	B1	3760	B2	4519	B5	4540	D1	4563	A1	7513	C5	7541	D2		
2531	C3	2580	C4	2615	D4	2651	A3	2715	C1	2753	B1	2790	B2	3535	B2	3556	A3	3580	C4	3601	B4	3622	D5	3646	D2	3673	D2	3713	C1	3734	B1	3761	A2	4520	C5	4541	D1	4565	B1	7515	D2	7542	D2		
2535	B2	2581	C4	2616	D5	2652	A4	2716	C1	2754	B1	3501	C3	3536	C2	3557	A3	3581	B4	3602	C4	3623	D4	3647	D2	3674	D2	3714	C1	3735	B1	3762	B2	4522	A6	4542	D1	4566	B2	7521	D6	7543	D2		
2536	C2	2584	B4	2617	D5	2656	A5	2719	C1	2755	B1	3502	C3	3537	B2	3558	C5	3583	B5	3603	D5	3624	D5	3648	D2	3675	D2	3715	C1	3736	C1	3765	B6	4523	A5	4543	A1	4567	B2	7522	D6	7551	B5		
2537	B2	2595	B5	2618	D5	2657	B5	2720	C1	2759	B1	3511	B4	3538	C2	3559	D5	3584	C5	3604	D5	3625	D4	3649	A3	3676	D2	3716	C1	3737	B1	3770	A3	4524	B5	4544	A1	4568	A6	7523	B6	7553	A4		
2538	C2	2596	C5	2623	B5	2658	C1	2721	C1	2760	B6	3512	C4	3540	C6	3560	D5	3585	B5	3605	D5	3626	D5	3650	A4	3677	D2	3717	C1	3738	A1	4501	B5	4525	C5	4545	A4	4571	C2	7524	C5	7711	B1		
2539	C2	2597	B5	2624	C5	2662	D2	2722	C1	2761	A1	3514	C3	3541	C3	3563	C2	3586	C5	3606	D5	3627	D4	3651	A3	3678	D2	3718	C1	3741	A2	4502	C5	4527	C3	4546	A6	4573	C2	7526	A3	7712	B2		



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

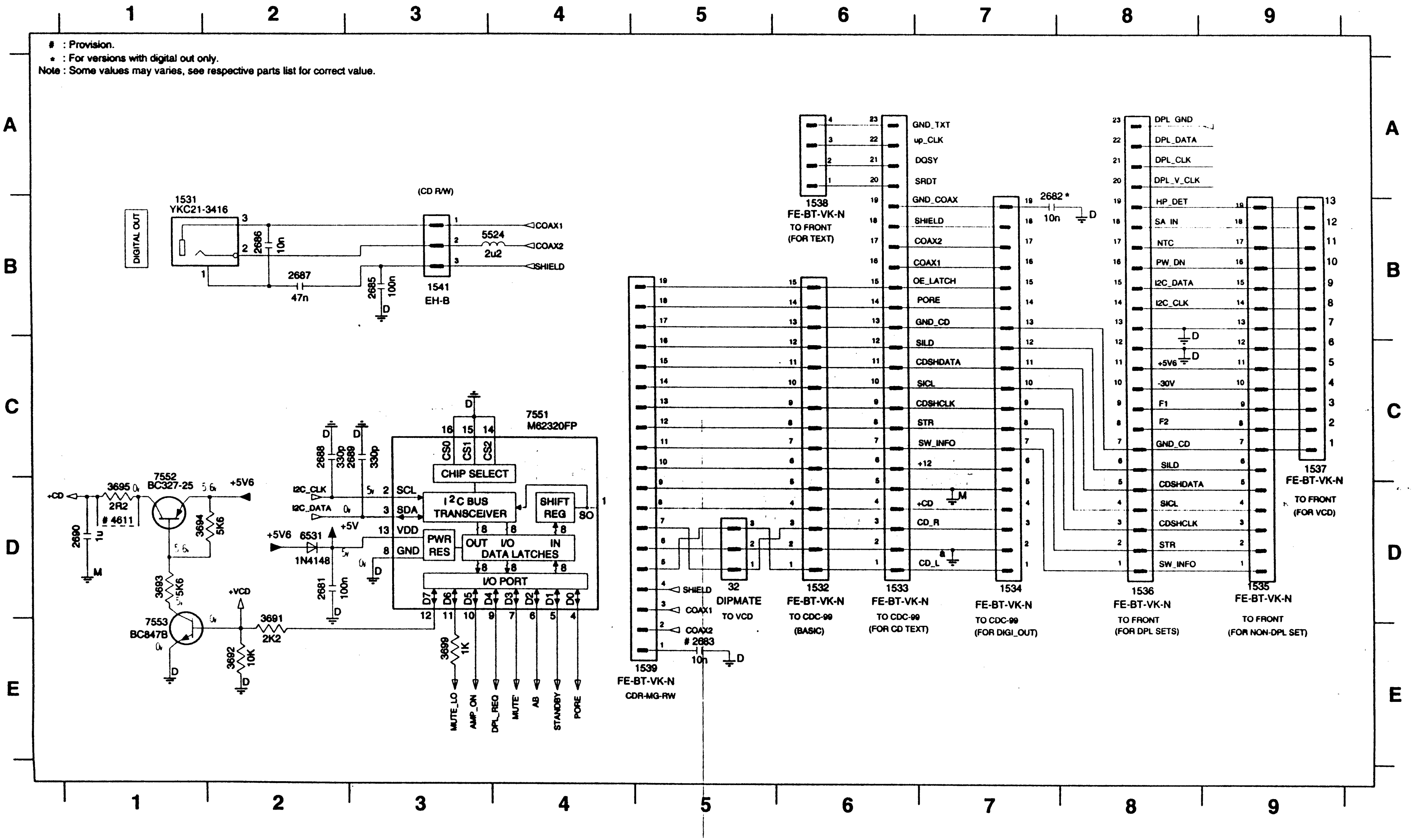
21	D3	1521	A6	1535	A2	2521	A5	2552	A4	2583	C3	2640	C5	2717	C6	2748	B6	2770	C6	3533	C5	3632	D5	5511	D4	7525	C3	9526	A1	9539	B1	9552	D4	9565	C3	9579	C2	9592	A3	9605	C1	9618	A6	9631	A3
23	A6	1522	A6	1536	A1	2522	A5	2560	D2	2591	B2	2641	D5	2718	C5	2749	B6	2771	B4	3534	C5	3641	D3	5711	B6	7552	B2	9527	A2	9540	C1	9553	D4	9566	C3	9580	B3	9593	A3	9606	C4	9619	C5	9632	A3
24	C1	1523	A6	1537	A2	2525	C1	2561	B3	2592	C2	2647	C5	2727	C6	2750	B6	2772	B5	3539	C4	3655	A2	5712	B6	9511	C5	9528	A1	9541	C1	9554	D4	9567	C3	9581	B3	9594	A3	9607	A5	9620	C5	9633	A4
25	A5	1525	C1	1538	B2	2526	D1	2562	C3	2593	C2	2648	D5	2728	C6	2751	B5	2773	A5	3546	A6	3681	D5	6511	A5	9513	A3	9529	B1	9542	C2	9555	C5	9568	C3	9582	B3	9595	A3	9608	A6	9621	B4	9634	A4
26	A6	1526	D1	1539	B1	2532	B4	2563	B3	2594	C2	2655	A1	2729	C6	2752	B6	2774	B5	3561	B5	3699	B2	6512	B3	9514	A3	9530	B2	9543	C1	9556	D3	9569	C4	9583	B3	9596	A3	9609	A5	9622	D5	9635	B3
27	A3	1527	C1	1541	A1	2533	B4	2564	C3	2599	D5	2661	D5	2730	C6	2756	B5	2779	B4	3562	B5	3739	A5	6513	A3	9517	A6	9531	A2	9544	C2	9557	C3	9570	C3	9584	C4	9597	A4	9610	A1	9623	A4	9636	B3
28	A3	1528	C5	1711	A4	2534	C4	2571	B2	2609	D2	2664	D5	2731	C6	2757	B5	2780	B5	3577	B3	3740	B4	6514	A3	9518	A6	9532	B1	9545	D1	9558	C2	9571	C4	9585	C4	9598	A3	9611	B5	9624	A6	9637	D4
29	A3	1529	A5	1712	B1	2540	B4	2572	C2	2610	D2	2665	D5	2732	C6	2758	A6	3513	B4	3578	B3	3745	B6	6515	D2	9519	C5	9533	B1	9546	D1	9559	C3	9573	B2	9586	C4	9599	B4	9612	C5	9625	A2	9638	A6
30	A2	1530	A4	2511	D3	2541	D1	2573	B2	2619	C4	2666	D5	2735	C6	2762	B6	3521	B4	3582	C3	3746	B6	6516	D6	9520	A4	9534	A2	9547	D1	9560	C3	9574	C2	9587	B4	9600	B4	9613	B5	9626	A6	9639	B6
31	A3	1531	A1	2512	D3	2542	D1	2574	C2	2620	D4	2711	C6	2742	B6	2765	B6	3522	C4	3593	D4	3752	B5	6517	A4	9521	A2	9535	B2	9548	D3	9561	C3	9575	B2	9588	B3	9601	B4	9614	B2	9627	A6	9640	B4
32	B1	1532	B1	2513	B4	2546	A5	2575	C2	2621	D3	2712	C6	2743	B6	2766	C6	3530	D1	3607	D2	3767	A6	6531	B3	9523	A1	9536	B2	9549	D3	9562	C3	9576	B2	9589	B3	9602	B4	9615	C5	9628	A4	9711	B6
1501	D6	1533	B2	2514	C4	2549	C4	2576	C2	2631	D4	2713	C6	2744	B6	2767	B5	3531	B5	3608	D2	3768	A6	6711	A6	9524	A2	9537	A1	9550	B1	9563	C3	9577	B2	9590	A3	9603	B4	9616	A4	9629	A1	9712	A6
1502	D6	1534	B1	2518	C3	2550	C4	2582	C2	2632	D5	2714	C6	2745	B6	2769	B6	3532	C5	3631	C5	3769	A6	6712	A6	9525	A2	9538	B1	9551	D4	9564	C3	9578	B2	9591	B3	9604	A5	9617	B4	9630	A3		



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

AF6 BOARD - CIRCUIT DIAGRAM (PART 2)

32	D5
1531	B1
1532	D6
1533	D6
1534	D7
1535	D9
1536	D8
1537	C9
1538	B6
1539	E5
1541	B3
2681	D2
2682	B7
2683	E5
2685	B3
2686	B2
2687	B2
2688	C2
2689	C3
2690	D1
3691	E2
3692	E2
3693	D1
3694	D1
3695	D1
3699	E3
4611	D1
5524	B4
6531	D2
7551	C4
7552	D1
7553	E1


: Provision.

∗ : For versions with digital out only.

Note : Some values may varies, see respective parts list for correct value.

1
2
3
4
5
6
7
8
9
A
B
C
D
E
DIGITAL OUT
1531
YKC21-3416
2686
10n
2687
47n
2685
100n
D
(CD R/W)
1541
EH-B
COAX1
COAX2
SHIELD
5524
2u2
7551
M62320FP
CS0
CS1
CS2
16
15
14
CHIP SELECT
I²C BUS TRANSCEIVER
SHIFT REG
SO
SCL
SDA
VDD
GND
PWR RES
OUT I/O IN
DATA LATCHES
I/O PORT
D7 D6 D5 D4 D3 D2 D1 D0
12 11 10 9 7 6 5 4
I2C_CLK
I2C_DATA
2688
330p
2689
330p
+5V6
6531
1N4148
+5V
2681
100n
+CD
3695
2R2
# 4611
2690
1u
M
7552
BC327-25
3694
5K6
3693
5K6
7553
BC847B
+VCD
3691
2K2
3692
10K
3699
1K
MUTE_LO
AMP_ON
DPL_REQ
MUTE
AB
STANDBY
PORE
1539
FE-BT-VK-N
CDR-MG-RW
SHIELD
COAX1
COAX2
# 2683
10n
32
DIPMATE
TO VCD
1532
FE-BT-VK-N
TO CDC-99
(BASIC)
1538
FE-BT-VK-N
TO FRONT
(FOR TEXT)
1533
FE-BT-VK-N
TO CDC-99
(FOR CD TEXT)
GND_TXT
up_CLK
DQSY
SRDT
GND_COAX
SHIELD
COAX2
COAX1
OE_LATCH
PORE
GND_CD
SILD
CDSHDATA
SICL
CDSHCLK
STR
SW_INFO
+12
+CD
CD_R
CD_L
2682 *
10n
1534
FE-BT-VK-N
TO CDC-99
(FOR DIGI_OUT)
1536
FE-BT-VK-N
TO FRONT
(FOR DPL SETS)
DPL_GND
DPL_DATA
DPL_CLK
DPL_V_CLK
HP_DET
SA_IN
NTC
PW_DN
I2C_DATA
I2C_CLK
+5V6
-30V
F1
F2
GND_CD
SILD
CDSHDATA
SICL
CDSHCLK
STR
SW_INFO
1535
FE-BT-VK-N
TO FRONT
(FOR NON-DPL SET)
1537
FE-BT-VK-N
TO FRONT
(FOR VCD)

ELECTRICAL PARTS LIST - AF6 BOARD

MISCELLANEOUS

1523	482226710953	Flex Connector 7P
1525	482226720452	Cinch Socket - Aux in
1526	482226720452	Cinch Socket - Line-out
1527	482226731729	Cinch Socket - Sub-Woofer out
1528	482226710731	Flex Connector 6P
1531	482226731729	Cinch Socket - Digital out
1534	482226511553	Flex Connector 19P
1535	482226511553	Flex Connector 19P

CAPACITORS

2501	482212614585	100nF 10% 50V
2511	482212440769	4,7µF 20% 100V
2512	482212440769	4,7µF 20% 100V
2513	482212440769	4,7µF 20% 100V
2514	482212440769	4,7µF 20% 100V
2515	532212232531	100pF 5% 50V
2516	532212232531	100pF 5% 50V
2517	482212614585	100nF 10% 50V
2518	482212440433	47µF 20% 25V
2519	532212232531	100pF 5% 50V
2520	532212232531	100pF 5% 50V
2521	482212440769	4,7µF 20% 100V
2522	482212440769	4,7µF 20% 100V
2523	532212232658	22pF 5% 50V
2524	532212232658	22pF 5% 50V
2525	482212421913	1µF 20% 63V
2526	482212421913	1µF 20% 63V
2527	532212234099	470pF 10% 63V
2528	532212234099	470pF 10% 63V
2529	482212613838	100nF +80/-20% 50V
2530	482212614585	100nF 10% 50V
2531	532212232654	22nF 10% 63V
2532	482212440433	47µF 20% 25V
2533	482212440769	4,7µF 20% 100V
2534	482212440769	4,7µF 20% 100V
2535	482212232535	680pF 10% 63V
2536	482212232535	680pF 10% 63V
2537	482212613692	47pF 1% 63V
2538	482212613692	47pF 1% 63V
2539	532212232654	22nF 10% 63V
2540	482212440433	47µF 20% 25V
2541	482212421913	1µF 20% 63V
2542	482212421913	1µF 20% 63V
2543	482212233127	2,2nF 10% 63V
2544	482212233127	2,2nF 10% 63V
2545	482212613838	100nF +80/-20% 50V
2546	482212441751	47µF 20% 50V
2547	532212232448	10pF 5% 63V
2548	532212232448	10pF 5% 63V
2549	482212440769	4,7µF 20% 100V
2550	482212440769	4,7µF 20% 100V
2551	482212614585	100nF 10% 50V
2552	482212441751	47µF 20% 50V
2553	482212613486	15pF 2% 63V
2560	482212441407	0,47µF 20% 63V
2561	482212441407	0,47µF 20% 63V
2562	482212441407	0,47µF 20% 63V
2563	482212142408	220nF 5% 63V
2564	482212142408	220nF 5% 63V
2565	482212610525	8,2nF 10% 63V
2566	482212610525	8,2nF 10% 63V
2571	482212151252	470nF 5% 63V
2572	482212151252	470nF 5% 63V
2573	482212151252	470nF 5% 63V
2574	482212151252	470nF 5% 63V
2575	482212151252	470nF 5% 63V
2576	482212151252	470nF 5% 63V
2577	532212231866	6,8nF 10% 63V
2578	532212231866	6,8nF 10% 63V
2579	532212231647	1nF 10% 63V
2580	532212231647	1nF 10% 63V
2581	482212233127	2,2nF 10% 63V
2582	482212440207	100µF 20% 25V
2583	482212440207	100µF 20% 25V
2584	532212232654	22nF 10% 63V
2591	482212480144	220µF 20% 25V
2592	482212480144	220µF 20% 25V
2593	482212440433	47µF 20% 25V
2594	482212440433	47µF 20% 25V
2595	532212234099	470pF 10% 63V
2596	532212234099	470pF 10% 63V
2597	482212233575	220pF 5% 63V
2598	482212233575	220pF 5% 63V
2599	482212441751	47µF 20% 50V
2601	482212612105	33nF 5% 50V
2602	482212612105	33nF 5% 50V
2603	482212233891	3,3nF 10% 63V
2604	482212233891	3,3nF 10% 63V
2605	532212234099	470pF 10% 63V
2606	532212234099	470pF 10% 63V
2607	482212614585	100nF 10% 50V
2608	482212614585	100nF 10% 50V
2609	482212151252	470nF 5% 63V
2610	482212151252	470nF 5% 63V
2611	482212610847	1,8nF 10% 63V
2612	482212610847	1,8nF 10% 63V
2613	532212231647	1nF 10% 63V
2614	532212231647	1nF 10% 63V
2615	482212233575	220pF 5% 63V
2616	482212233575	220pF 5% 63V
2617	532212234099	470pF 10% 63V
2618	532212234099	470pF 10% 63V
2619	482212422652	2,2µF 20% 50V
2620	482212422652	2,2µF 20% 50V

ELECTRICAL PARTS LIST - AF6 BOARD

CAPACITORS

2621	482212440207	100µF 20% 25V
2623	482212613482	470nF +80/-20% 16V
2624	482212613482	470nF +80/-20% 16V
2631	482212421913	1µF 20% 63V
2632	482212421913	1µF 20% 63V
2633	532212234099	470pF 10% 63V
2634	532212234099	470pF 10% 63V
2637	482212613692	47pF 1% 63V
2638	482212613692	47pF 1% 63V
2639	532212232654	22nF 10% 63V
2640	482212440433	47µF 20% 25V
2641	482212440207	100µF 20% 25V
2647	482212481151	22µF 50V
2648	482212481151	22µF 50V
2649	532212232531	100pF 5% 50V
2650	532212232531	100pF 5% 50V
2655	482212440769	4,7µF 20% 100V
2658	482212233575	220pF 5% 63V
2661	482212421913	1µF 20% 63V
2662	532212231647	1nF 10% 63V
2663	532212232448	10pF 5% 63V
2664	482212421913	1µF 20% 63V
2666	482212440207	100µF 20% 25V
2668	532212234099	470pF 10% 63V
2669	482212613838	100nF +80/-20% 50V
2681	482212614585	100nF 10% 50V
2682	532212234098	10nF 10% 63V
2685	482212613838	100nF +80/-20% 50V
2686	482212614585	100nF 10% 50V
2687	482212613751	47nF 10% 63V
2688	532212231863	330pF 5% 63V
2689	532212231863	330pF 5% 63V
2690	482212614043	1µF +80-20% 16V
2694	482212613838	100nF +80/-20% 50V

RESISTORS

3501	482205110102	1k 2% 0,25W
3502	482211710833	10k 1% 0,1W
3511	482205120182	1k8 5% 0,1W
3512	482205120182	1k8 5% 0,1W
3513	482211683961	6k8 5%
3514	482211711507	6k8 1% 0,1W
3515	482211711507	6k8 1% 0,1W
3516	482211711507	6k8 1% 0,1W
3517	482205120332	3k3 5% 0,1W
3518	482205120332	3k3 5% 0,1W
3519	482205120333	33k 5% 0,1W
3520	482205120333	33k 5% 0,1W
3521	482211652234	100k 5% 0,5W
3522	482211652234	100k 5% 0,5W
3523	482211711149	82k 1% 0,1W
3524	482211711149	82k 1% 0,1W
3525	482205110102	1k 2% 0,25W
3526	482205110102	1k 2% 0,25W
3527	482205110102	1k 2% 0,25W
3528	482205110102	1k 2% 0,25W
3529	482211711449	2k2 1% 0,1W
3530	482211652256	2k2 5% 0,5W
3531	482211652256	2k2 5% 0,5W
3532	482211652256	2k2 5% 0,5W
3533	482211652234	100k 5% 0,5W
3534	482211652234	100k 5% 0,5W
3535	482211710837	100k 1% 0,1W
3536	482211710837	100k 1% 0,1W
3537	482205120333	33k 5% 0,1W
3538	482205120333	33k 5% 0,1W
3540	482211710833	10k 1% 0,1W
3541	482205110102	1k 2% 0,25W
3542	482205110102	1k 2% 0,25W
3543	482211711507	6k8 1% 0,1W
3544	482211711507	6k8 1% 0,1W
3545	482205120273	27k 5% 0,1W
3546	482211652264	27k 5% 0,5W
3547	482205120182	1k8 5% 0,1W
3548	482205120182	1k8 5% 0,1W
3549	482205120562	5k6 5% 0,1W
3550	482211710834	47k 1% 0,1W
3551	482205120154	150k 5% 0,1W
3552	482205120154	150k 5% 0,1W
3553	482205120334	330k 5% 0,1W
3554	482211710353	150R 1% 0,1W
3555	482205120391	390R 5% 0,1W
3556	482211711449	2k2 1% 0,1W
3557	482211711149	82k 1% 0,1W
3558	482205120225	2M2 5% 0,1W
3559	482205120225	2M2 5% 0,1W
3560	482205120475	4M7 5% 0,1W
3563	482211711449	2k2 1% 0,1W
3564	482211711449	2k2 1% 0,1W
3565	482211711449	2k2 1% 0,1W
3566	482211711449	2k2 1% 0,1W
3567	482205120223	22k 5% 0,1W
3568	482205120223	22k 5% 0,1W
3569	482205120472	4k7 5% 0,1W
3570	482205120472	4k7 5% 0,1W
3571	482205120472	4k7 5% 0,1W
3572	482205120472	4k7 5% 0,1W
3573	482205120472	4k7 5% 0,1W
3574	482205120472	4k7 5% 0,1W
3575	482211711503	220R 1% 0,1W
3576	482211711503	220R 1% 0,1W
3577	482205011002	1k 1% 0,4W
3578	482205011002	1k 1% 0,4W
3580	482205110102	1k 2% 0,25W

ELECTRICAL PARTS LIST - AF6 BOARD

3581	482211711449	2k2 1% 0,1W
3582	482211652256	2k2 5% 0,5W
3583	482211711503	220R 1% 0,1W
3584	482211711503	220R 1% 0,1W
3585	482211710834	47k 1% 0,1W
3586	482211710834	47k 1% 0,1W
3587	482205120154	150k 5% 0,1W
3588	482205120154	150k 5% 0,1W
3589	482211711449	2k2 1% 0,1W
3590	482211711449	2k2 1% 0,1W
3591	482205120223	22k 5% 0,1W
3592	482205120223	22k 5% 0,1W
3593	482211683884	47k 5% 0,5W
3594	482211710834	47k 1% 0,1W
3595	482205120333	33k 5% 0,1W
3596	482211710834	47k 1% 0,1W
3597	482205120105	1M 5% 0,1W
3598	482205120475	4M7 5% 0,1W
3599	482211711148	56k 1% 0,1W
3600	482211711148	56k 1% 0,1W
3601	482205120332	3k3 5% 0,1W
3602	482205120332	3k3 5% 0,1W
3603	482205120684	680k 5% 0,1W
3604	482205120684	680k 5% 0,1W
3605	482211713579	220k 1% 0,1W
3606	482211713579	220k 1% 0,1W
3607	482205021003	10k 1% 0,6W
3608	482205021003	10k 1% 0,6W
3609	482211710833	10k 1% 0,1W
3610	482211710833	10k 1% 0,1W
3611	482205120562	5k6 5% 0,1W
3612	482205120562	5k6 5% 0,1W
3613	482205120562	5k6 5% 0,1W
3614	482205120562	5k6 5% 0,1W
3615	482205120562	5k6 5% 0,1W
3616	482205120562	5k6 5% 0,1W
3617	482205120822	8k2 5% 0,1W
3618	482205120822	8k2 5% 0,1W
3619	482205120822	8k2 5% 0,1W
3620	482205120822	8k2 5% 0,1W
3621	482205120822	8k2 5% 0,1W
3622	482205120822	8k2 5% 0,1W
3623	482211710834	47k 1% 0,1W
3624	482211710834	47k 1% 0,1W
3625	482205110102	1k 2% 0,25W
3626	482205110102	1k 2% 0,25W
3627	482211711503	220R 1% 0,1W
3628	482211711503	220R 1% 0,1W
3629	482211711454	820R 1% 0,1W
3631	482211652231	820R 5% 0,5W
3632	482211652231	820R 5% 0,5W
3633	482205120562	5k6 5% 0,1W
3634	482205120562	5k6 5% 0,1W
3635	482211710833	10k 1% 0,1W
3636	482211710833	10k 1% 0,1W
3637	482211710834	47k 1% 0,1W
3638	482211710834	47k 1% 0,1W
3639	482211711383	12k 1% 0,1W
3640	482211711383	12k 1% 0,1W
3641	482205210109	△ 10R 5% 0,33W
3642	482205120472	4k7 5% 0,1W
3643	482205120472	4k7 5% 0,1W
3645	482205120479	47R 5% 0,1W
3646	482205120479	47R 5% 0,1W
3647	482205120479	47R 5% 0,1W
3648	482205120479	47R 5% 0,1W
3649	482211711454	820R 1% 0,1W
3650	482211711454	820R 1% 0,1W
3651	482205120392	3k9 5% 0,1W
3652	482205120392	3k9 5% 0,1W
3655	482205021003	10k 1% 0,6W
3656	482211710833	10k 1% 0,1W
3657	482205110102	1k 2% 0,25W
3658	482205120562	5k6 5% 0,1W
3660	482205120472	4k7 5% 0,1W
3661	482205120475	4M7 5% 0,1W
3662	482205110102	1k 2% 0,25W
3663	482205110102	1k 2% 0,25W
3671	482211713579	220k 1% 0,1W
3672	482211713579	220k 1% 0,1W
3673	482211712955	2k7 1% 0,1W
3674	482205120334	330k 5% 0,1W
3675	482211711449	2k2 1% 0,1W
3676	482205120229	22R 5% 0,1W
3677	482205120471	470R 5% 0,1W
3681	482205210229	△ 22R 5% 0,33W
3682	482205110102	1k 2% 0,25W
3683	482205120471	470R 5% 0,1W
3684	482205120392	3k9 5% 0,1W
3691	482211711449	2k2 1% 0,1W
3692	482211710833	10k 1% 0,1W
3693	482205120562	5k6 5% 0,1W
3694	482205120562	5k6 5% 0,1W
3695	482205120228	2R2 5% 0,1W
3699	482205011002	1k 1% 0,4W
3768	482205011002	1k 1% 0,4W
4513	482205120008	0R Jumper 0805
4514	482205120008	0R Jumper 0805
4515	482205120008	0R Jumper 0805
4522	482205120008	0R Jumper 0805
4523	482205120008	0R Jumper 0805
4524	482205120008	0R Jumper 0805
4525	482205120008	0R Jumper 0805
4527	482205120008	0R Jumper 0805

ELECTRICAL PARTS LIST - AF6 BOARD

RESISTORS

4528	482205120008	0R Jumper 0805
4529	482205120008	0R Jumper 0805
4530	482205120008	0R Jumper 0805
4531	482205120008	0R Jumper 0805
4532	482205120008	0R Jumper 0805
4533	482205120008	0R Jumper 0805
4534	482205120008	0R Jumper 0805
4535	482205120008	0R Jumper 0805
4536	482205120008	0R Jumper 0805
4537	482205120008	0R Jumper 0805
4538	482205120008	0R Jumper 0805
4539	482205120008	0R Jumper 0805
4540	482205120008	0R Jumper 0805
4541	482205120008	0R Jumper 0805
4542	482205120008	0R Jumper 0805
4543	482205120008	0R Jumper 0805
4544	482205120008	0R Jumper 0805
4545	482205120008	0R Jumper 0805
4546	482205120008	0R Jumper 0805
4547	482205120008	0R Jumper 0805
4548	482205120008	0R Jumper 0805
4549	482205120008	0R Jumper 0805
4551	482205120008	0R Jumper 0805
4553	482205120008	0R Jumper 0805
4554	482205120008	0R Jumper 0805
4556	482205120008	0R Jumper 0805
4557	482205120008	0R Jumper 0805
4558	482205120008	0R Jumper 0805
4559	482205120008	0R Jumper 0805
4561	482205120008	0R Jumper 0805
4562	482205120008	0R Jumper 0805
4563	482205120008	0R Jumper 0805
4565	482205120008	0R Jumper 0805
4566	482205120008	0R Jumper 0805
4567	482205120008	0R Jumper 0805
4571	482205120008	0R Jumper 0805
4573	482205120008	0R Jumper 0805
4580	482205120008	0R Jumper 0805
4712	482205120008	0R Jumper 0805
4714	482205120008	0R Jumper 0805
4715	482205120008	0R Jumper 0805
4716	482205120008	0R Jumper 0805

COILS & FILTERS

5511	482215762552	Coil 2,2µH 5%
5524	482215710586	Coil 2,2µH 10%

DIODES

6511	933887190673	DIO REG BZX55-F9V1
6512	933887190673	DIO REG BZX55-F9V1
6513	482213031878	1N4003G
6515	482213030621	1N4148
6516	482213030621	1N4148
6531	482213030621	1N4148

TRANSISTOR & INTEGRATED CIRCUITS

7511	482220933652	TEA6321T/V1
7512	482220983357	NJM4560M
7513	482220983357	NJM4560M
7515	482220931378	NJM4556AM
7521	482213060511	BC847B
7522	482213060511	BC847B
7523	482213060511	BC847B
7524	482213060511	BC847B
7525	482213040959	BC547B
7526	482213060373	BC856B
7527	482213060511	BC847B
7528	482213060511	BC847B
7529	482213060373	BC856B
7531	482213060511	BC847B
7532	482213060511	BC847B
7533	482213060511	BC847B
7534	482213060511	BC847B
7535	482213042804	BC817-25
7536	482213042804	BC817-25
7537	482213060511	BC847B
7538	482213060511	BC847B
7539	482213060373	BC856B
7541	482213060511	BC847B
7543	482213042804	BC817-25
7551	482220917345	M62320FP
7552	482213041246	BC327-25
7553	482213060511	BC847B

Note : Only the parts mentioned in this list are normal service spare parts.

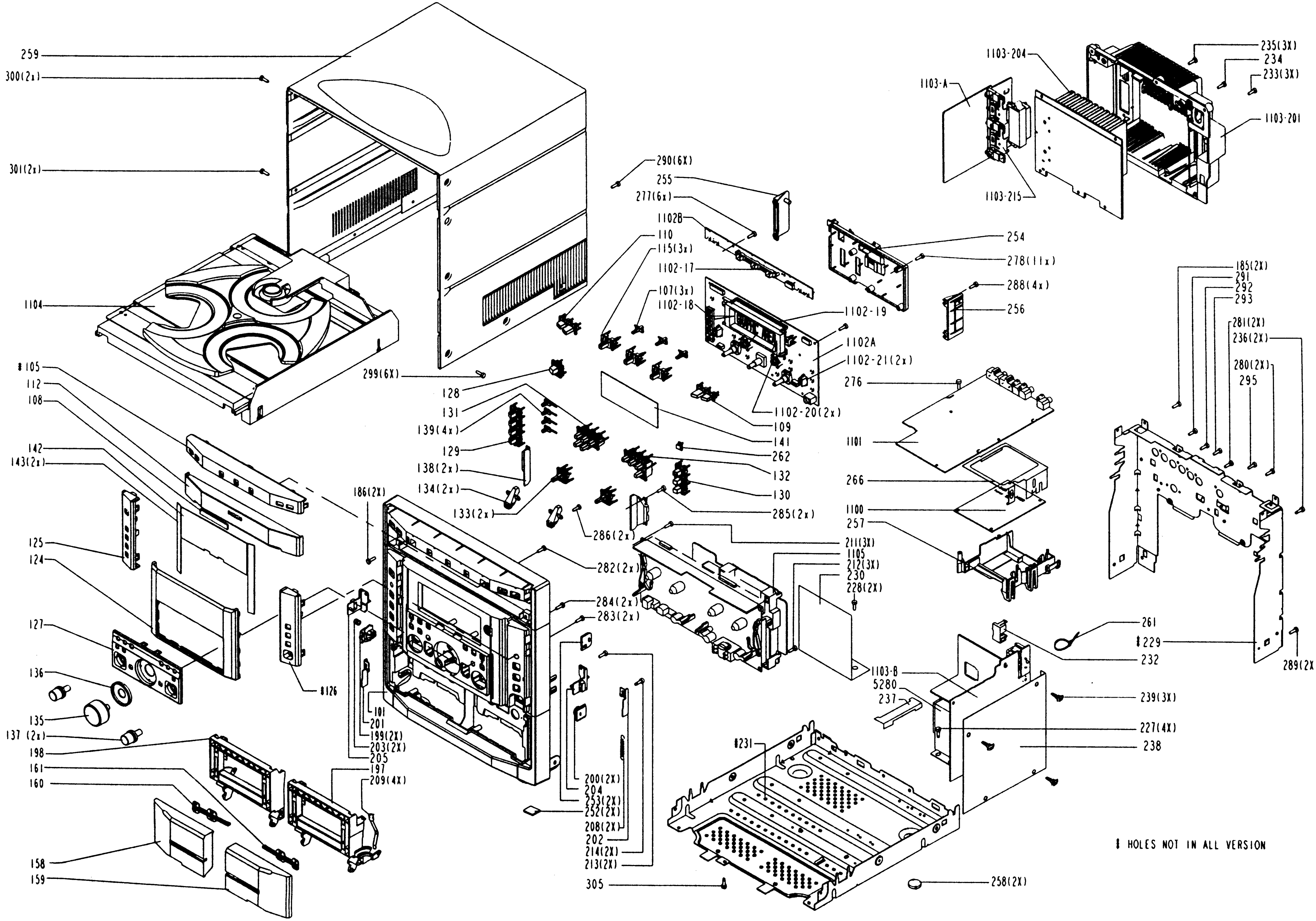
MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

0101	3139 117 88160		Cabinet Front
0105	3139 117 88170		Panel Front CDC /22
0105	3139 117 89110		Panel Front CDC Non RDS /37
0108	4822 454 13408		Badge-Philips Assembly
0109	3139 117 88270		Button Set Open/Close
0110	3139 117 88250		Button Set NEWS/RDS /22
0112	3139 117 88220		Cover Tray CDC
0115	3139 117 88260		Button CDC Select
0124	3139 117 88210		Lens Window Display
0125	3139 117 88180		Panel Front Display Left
0126	3139 117 89190		Panel Front Display Right
0127	3139 117 88200		Panel Front Display Center
0128	3139 117 88280		Button Standby/On
0129	3139 117 88290		Button Set Source
0130	3139 117 89180		Button Set Clock/Timer
0131	3139 117 88310		Button Set Control
0132	3139 117 88320		Button Set Record
0133	3139 117 88330		Button IS/Loudness
0135	3139 117 88340		Knob Volume
0136	3139 117 89030		Ring Knob Volume Foiled
0137	3139 117 88350		Knob Bass/Treble
0158	3139 117 88230		Cover Cassette Left
0159	3139 117 88240		Cover Cassette Right
0160	3139 114 67090		Lens Cassette Right
0161	3139 114 67080		Lens Cassette Left
0197	4822 443 10488		Door Cassette Right
0198	4822 443 10487		Door Cassette Left
0199	4822 402 10621		Push-Catch
0200	4822 529 10322		Damper Assembly
0203	4822 492 11344		Spring Compression
0204	4822 402 11246		Bracket-Right
0205	4822 402 11245		Bracket-Left
0208	4822 492 11345		Spring Tension
0209	4822 492 42787		Spring Cassette
0232	4822 402 10288		Bracket Mains Socket
0239	4822 466 93148		Spacer 5mm
0252	4822 462 40683		Foot Rubber (SQ)
0254	3139 114 67340		Plate Front
0258	4822 462 40683		Plate (Foot)
0259	4822 426 10807		Cabinet Rear
0350	3139 118 77060		L/R Loudspeaker Box /22
0350	3139 118 77050		L/R Loudspeaker Box /37
0351	4822 303 50063		FM Aerial
0356	3139 118 77040		Remote Control
0384	4822 303 50082		AM Frame Aerial
0385	4822 321 10249	⚠	Mains Cord /22
0385	4822 321 11466	⚠	Mains Cord /37
0387	3139 116 19160		Instruction For Use /22
0387	3139 116 19200		Instruction For Use /37
1571	3139 110 34330		Cable Foil 06P/180/06P BD
1573	4822 320 12654		Flex Cable AD 07P 220mm
1653	4822 320 12655		Flex Cable BD 07P 120mm
1680	3139 110 34260		Cable Foil 10P/280/10P AD
1681	4822 320 12657		Flex Cable BD 19P 560mm
5280	4822 146 10728	⚠	Mains Transformer /22
5280	4822 146 11129	⚠	Mains Transformer /37

Note : Only the parts mentioned in this list are normal service spare parts.

SCREW LISTS - MAIN UNIT

185	D3 x 10
186	D3 x 10
211	D3 x 10
212	D3 x 10
213	D3 x 10
214	D3 x 10
227	M3 x 6
228	M3 x 6
233	M3 x 10
234	D3 x 12
235	M3 x 10
236	M3 x 10
276	D3 x 12
277	D3 x 10
278	D3 x 10
280	D3 x 10
281	D3 x 10
282	D3 x 10
283	D3 x 10
284	D3 x 10
285	D2 x 8
286	D2 x 8
288	D3 x 10
289	M3 x 10
290	M3 x 10
291	D3 x 12
292	D3 x 12
293	D3 x 12
295	D3 x 12
299	M3 x 10
300	M3 x 12
301	M3 x 10
305	M3 x 6


259
300(2x)
301(2x)
1104
‡105
112
108
142
143(2x)
125
124
127
136
135
137 (2x)
198
161
160
158
159
290(6X)
255
277(6x)
1102B
110
115(3x)
1102-17
107(3x)
1102-18
1102-19
1102A
1102-21(2x)
1102-20(2x)
109
141
262
132
130
285(2x)
286(2x)
299(6X)
128
131
139(4x)
129
138(2x)
134(2x)
133(2x)
186(2X)
‡126
101
201
199(2X)
203(2X)
205
197
209(4X)
282(2x)
284(2x)
283(2x)
200(2X)
204
253(2X)
252(2X)
208(2X)
202
214(2X)
213(2X)
305
211(3X)
1105
212(3X)
230
228(2X)
‡231
1103-B
5280
237
258(2X)
1103-204
1103-A
1103-215
1103-201
235(3X)
234
233(3X)
254
278(11x)
288(4x)
256
276
1101
266
1100
257
261
‡229
232
239(3X)
227(4X)
238
185(2X)
291
292
293
281(2X)
236(2X)
280(2X)
295
289(2X)

‡ HOLES NOT IN ALL VERSION